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ABSTRACT

Although it was generally recognized that the acquisition of productive skills occurred mainly in private industry, either through formal company training programs or simply through "learning by doing," very little specific information about such training was available. This study of the inplant training procedures of one company was conducted to provide data on industrial training practices to determine the relative benefits of different types of skills acquisition training, to examine the transferability of skills, and to evaluate the methodological techniques used in surveys of company training programs. It was found that a combination of classroom and on-the-job training resulted in quicker promotion and higher salaries for employees than either of these forms of training alone. Previous education and training was found to reduce the amount of job training required. A shutdown of the plant being studied did not provide an appropriate test of transfer of skills from that plant to other employment, although the prior skill development was a major influence in transfer to new jobs. Recommended methods of data gathering for future surveys included a combination of personal interviews and mail questionnaires. (MF)

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Training and Skill Acquisition: A Pilot Case Study

by Gerald Somers
University of Wisconsin-Madison
and
Myron Roomkin
University of Chicago

Contract 81-55-71-04
Manpower Administration
U.S. Department of Labor

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University of Wisconsin-Madison
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TRAINING AND SKILL ACQUISITION: A PILOT CASE STUDY

by

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16. Abstracts: This study analyzes the training procedures, the sources, the costs, and the benefits of skill acquisition, and the transferability of skills in the Gisholt Machine Company in Madison, Wisconsin. The study also appraises methodological techniques in surveys of company training programs. Since substantial layoffs and complete shutdown of the plant occurred during the course of the survey, it was also possible to examine the transferability of skills from one company to another. The report contains a review of the literature, including bibliographic citations, on company training programs.

The training and skill acquisition at the Gisholt Company made a greater contribution to the employees' occupational advancement and earnings than the various forms of training and skill acquisition prior to their Gisholt employment. Within the company, the combination of classroom and on-the-job training resulted in greater advancement and earnings than either of these forms of training alone.

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TRAINING AND SKILL ACQUISITION: A PILOT CASE STUDY

HIGHLIGHTS

1. It was the objective of this case study to determine the training procedures, the sources, costs and benefits of skill acquisition, and the transferability of skills in the Gisholt Machine Company in Madison, Wisconsin. The study had the ancillary purpose of refining methodological techniques in surveys of company training programs.

2. Formal institutional training was much more important than on-the-job training in developing skills of Gisholt employees prior to their employment with the company. For skilled craftsmen, higher educational attainment, a later starting age, and a later year of entry into the company increased the probability that they would have had institutional training prior to their employment at Gisholt. However, only 9.3 percent of the skilled craftsmen had taken apprenticeship training prior to their first job at the company. Workers arrived at the same occupational skill status through a variety of paths. The Gisholt Company was able to take advantage of the prior skill development, since previous training and education served to reduce the need for training at Gisholt.

3. The combination of on-the-job training and classroom instruction resulted in more total training hours, more rapid promotion, and higher employee earnings than on-the-job training taken separately. This was true not only for apprenticeship training but for semiskilled and skilled workers who received training outside of the apprenticeship system. For mobile workers within the plant, training made the greatest contribution to earnings when the new job was in a different occupational skill category than the employee's first Gisholt job.

4. The company was able to provide only sparse and scattered data on the costs of training. Employees were able to indicate the costs of prior institutional training, and they, as well as supervisors, were able to make some estimates concerning the opportunity costs (time spent, forgone production, forgone earnings) of on-the-job training.

5. Substantial layoffs and complete shutdown of the Gisholt plant occurred during the course of the survey. The probability of re-employment was significantly greater for skilled craftsmen and semiskilled operatives than for laborers and clerical workers. Younger workers and those with greater educational attainment and vocational training had a significantly greater probability of re-employment after the plant shutdown than older workers, the less educated, and those without prior vocational training. Less than one-third of those who found new employment were given additional training on their new jobs. The most important influence on post-Gisholt earnings was the relatedness of the new post-Gisholt job to the job held by employees prior to the Gisholt shutdown.

6. The case study confirms the earlier conclusions of the University of Wisconsin study of the feasibility of obtaining data on company training programs. Mail questionnaire surveys of company officials and employees must be buttressed by more intensive personal interviews with smaller samples of employers and employees to produce reliable data. Data on the costs of training can be obtained in sufficient quantity and quality only after employers are educated and motivated to maintain appropriate cost records.

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In spite of the unstinting aid provided by these persons, the authors must assume responsibility for any deficiencies which remain.

G.S. and M.R.

TABLE OF CONTENTS

Page

HIGHLIGHTS ii

ACKNOWLEDGEMENTS iii

LIST OF TABLES vi

Chapter

I. INTRODUCTION 1

Purpose of the Study 1
Efforts to Obtain Data on Company Training 3
Efforts to Obtain Information on Skill Acquisition 6
The Remaining Chapters in This Report 8

II. TRAINING IN INDUSTRY: THE PRESENT STATE OF KNOWLEDGE 11

Some Theoretical Considerations 11
Empirical Studies of Industrial Training 18
Evaluation of Company Training and Skill Development 35
Some Unanswered Questions 42

III. METHODOLOGY 45

Reasons for Selecting the Gisholt Machine Company 45
The Gisholt Machine Company 46
How the Data Were Gathered 50
The Significance of Missing Data 56

IV. COMPANY SPONSORED WORKER TRAINING: AN OVERVIEW 62

The History of Training at Gisholt 63
Defining Training at Gisholt 67
The Types and Purposes of Training 69
Coordination and Evaluation 83
Mechanics of On-the-Job Training 88
Internal Training and the External Labor Market 91
The Influence of Collective Bargaining 95

V. THE SOURCES OF EMPLOYEE SKILLS 98

The Paths to Skill Acquisition 98
Training and Skill Acquisition Prior to Employment at the Gisholt Company 101
Preparation for Highest Paying Job at Gisholt Company 125

Chapter Page

Training and Experience on the First Jobs at Gisholt. . . . 129
Conclusions 138

VI. SELECTED BENEFITS OF COMPANY-SPONSORED TRAINING 141

Effects of Training on Earnings 141
Training and Worker Promotability 163
Time Required for Job Competence 169
Limitations on Results 174
Conclusions 175

VII. THE COSTS OF TRAINING 178

Employee Costs of Pre-Gisholt Institutional Training 178
Training Costs at the Gisholt Company 181
Conclusions 184

VIII. EMPLOYMENT AND TRAINING EXPERIENCE AFTER THE PLANT SHUTDOWN 186

Post-Gisholt Employment Experience 187
Training on the First Job After Gisholt 194
Post-Gisholt Earnings 196
Conclusions 200

IX. IMPLICATIONS FOR THE METHODOLOGY OF TRAINING SURVEYS 202

Relationship to Other Methodological Inquiries 202
Surveys of Employees Versus Surveys of Company Officials . . 207
Mail Questionnaires Versus Personal Interviews 209
Guidelines for Future Surveys of Training 210

X. SUMMARY AND CONCLUSIONS 213

Company Training Practices 213
The Sources of Employee Skills 215
The Benefits of Company Training 217
The Costs of Training 218
Employment and Training Experience After Plant Shutdown . . .219
The Methodology of Training Surveys 220

APPENDICES

A. MAIL QUESTIONNAIRE FOR HOURLY EMPLOYEES
B. PERSONAL INTERVIEW SCHEDULE FOR HOURLY EMPLOYEES
C. PERSONAL INTERVIEW FOR FOREMEN OR SUPERVISORS
D. DETERMINANTS OF THE PROBABILITY OF TRAINING ON THE FIRST GISHOLT JOB: COMPARISON OF THE RESULTS OF PROBIT ANALYSIS AND LEAST SQUARES REGRESSION
E. 1. PRE-GISHOLT TRAINING OF SKILLED CRAFTSMEN ON HIGHEST GISHOLT JOB
2. PRE-GISHOLT TRAINING OF OPERATIVES ON HIGHEST GISHOLT JOB
F. DESCRIPTION OF MACHINIST APPRENTICESHIP PROGRAM AT GISHOLT

LIST OF TABLES

Table		Page
III-1	Key Occupations Included in Skill Classifications	49
III-2	Response Rates by Method of Data Retrieval for Hourly Employees .	54
III-3	Comparison of Mail Questionnaire and Personal Interview Samples on Select Variables	58
III-4	Level of Satisfaction with Training and Employment Experience at Gisholt of Personal Interview Sample	61
V-1	Summary of Pre-Gisholt Vocational Training and Related Experiences: Proportion of Hourly Employees Reporting Vocational Training or Related Employment Experiences Acquired Before Joining Gisholt, By Type of Training or Experience and Occupation of First Gisholt Job	102
V-2	Associated Means for Table V-1: Year Started with Company, Age When First Employed by Company, and Educational Attainment for Workers Reporting Training, by Type of Training Reported . . .	106
V-3	Craftsmen Classified by Specific Occupation and Pre-Gisholt Training and Experience	109
V-4	Semiskilled Operatives Classified by Specific Occupation, Pre-Gisholt Training and Experience	111
V-5	Clerical Workers: Number and Percentage of Workers Entering as Clerical Workers Reporting Pre-Gisholt Vocational Training and Related Employment Experiences by Type of Experience and Type of Clerical Job	113
V-6	Laborers Classified by Specific Occupation and by Pre-Gisholt Training and Related Experience	115
V-7	Determinants of the Probability of Having Training Prior to Employment at the Gisholt Machine Company	117
V-8	Determinants of the Probability of Having Training Prior to Employment at the Gisholt Machine Company, By Occupation of First Job With Company	119
V-9	Determinants of the Probability of Having Training Prior to Employment at the Gisholt Machine Company by Type of Training . .	123
V-10	Pre-Gisholt Preparation for Highest-Paying Gisholt Job by Occupation	126

Table		Page
V-11	Mean Amount (Hours) and Type of Training Received on First Gisholt Job, by Prior Vocational Training or Related Employment Experience and Occupation of First Gisholt Job	130
V-12	Determinants of the Hours of Training on the First Gisholt Job, By Occupational Group	134
VI-1	Regression Analysis of Adjusted Weekly Earnings on First Gisholt Job, by Occupation Group	153
VI-2	Training Received by Registered Apprentices, OJT Trainees and OJT+Classroom Trainees in Preparation for Skilled Craftsmen Jobs	157
VI-3	Regression Analysis of Adjusted Weekly Earnings of Job Changers on Highest-Paying Company Job by Occupational Group	161
VI-4	Regression Analysis of Adjusted Weekly Earnings of All Craftsmen and Operatives on Highest-Paying Company Jobs	166
VI-5	Analysis of Time (Months) Required to Reach Highest-Paying Position by Occupation	171
VI-6	Regression Analysis of Time Required to Feel Competent in First Gisholt Job (In Hours) by Occupational Group	177
VII-1	Distribution of Employee Training Costs by Type of Cost and Type of Training Program for Production Workers in the Personal Interview Sample	185
VIII-1	Industrial Classification of Jobs Held in the Post-Gisholt Period	193
VIII-2	Occupational Mobility Matrix: Occupation of Post-Gisholt Job by Occupation of Highest-Paying Gisholt Job	195
VIII-3	Factors Influencing the Probability of Post-Gisholt Employment for all Former Employees	196
VIII-4	Percentage of Workers in Post-Gisholt Occupations Reporting Added Training by Occupation of Highest-Paying Gisholt Job	200
VIII-5	Regression Analysis of Average Weekly Earnings on Post-Gisholt Jobs by Occupational Group of Highest-Paying Gisholt Job	202

CHAPTER I

INTRODUCTION

1. Purpose of the Study

This study focuses on the methods, costs, and benefits of the acquisition of productive skills. Society has long recognized the vital importance of the development of worker skills in furthering national growth, production, and living standards. Traditional economic theories and the practicing philosophy of industrial economies also stress the crucial role of skill development as a source of remunerative employment and rising income standards for employees. Recent theoretical and empirical work on the investment in human capital has served further to arouse renewed interest in the development of employee skills.

In the past few years the question of skill acquisition has assumed even greater significance because of the role of federal manpower policy. The central thrust in aiding the disadvantaged in the labor market and in reducing welfare roles has been through manpower training. The initial concentration, at the beginning of the 1960s, was on institutional training through the cooperation of vocational schools and newly developed skill centers. Toward the end of the decade and at the present time, the emphasis has turned to federal encouragement and subsidization of private company training programs. Under the JOBS program of the National Alliance of Businessmen, as well as more recently proposed manpower and welfare reform legislation, effort is made to enlist the training abilities of private industry in upgrading the work force and in providing employment opportunities for disadvantaged workers.

However, the recent federal interest in manpower training programs for the disadvantaged is only the latest manifestation of a continuing governmental concern in this area. The federal government has long assumed responsibility, in collaboration with state and local units, for establishing standards in apprenticeship training for skilled draftsmen. The federal encouragement of "training within industry" during wartime provided another episode in the cooperative

effort of public and private training programs.

In spite of this long-standing and recently renewed emphasis on skill acquisition and training, there are serious gaps in our knowledge of the process and consequences of productive skill acquisition. We know most about institutional training in vocational schools, especially in federally funded training programs under the vocational training legislation and the Manpower Development and Training Act. However, it is generally recognized that most skill acquisition occurs in private industry, either through formal company training programs or simply through "learning by doing." Yet we have very little detailed information on the acquisition of skills in private industry. Data on formal company training programs are scanty, especially with regard to costs and consequences of such training. Even less is known about the method by which most workers may have acquired the skills they now possess, namely, the accretion of skill and knowledge directly through the process of work experience.

It is hoped that the gaps in data and knowledge can be partially met through an intensive examination and analysis of the methods of skill acquisition and training in one company. Although a single case study, taken alone, cannot provide a basis for generalization, supplementing previous surveys of wider scope but less depth, the case study approach can make a useful contribution to knowledge in this field. It can also provide a basis for extensions of survey methodology on industrial training practices in a wider area.

The specific objectives of the study are as follows:

(1) To document comprehensively the extent, character, and cost of training within one company for a wide spectrum of occupations ranging from semiskilled bloe-collar work to managerial positions.

(2) To determine the relative significance and benefits of vocational and technical education at the high school and post-high school levels, government-sponsored retraining programs, training in the armed forces, correspondence

courses, apprenticeship training, on-the-job training, and learning-by-doing through work experience for the welfare of the individual worker, the company, and the surrounding labor market.

(3) To provide detailed information which will enable the company to appraise its own training operations.

(4) To make the following methodological contributions to surveys of industrial training:

(a) to ascertain the differences in employee recall on training when data are gathered through a highly structured mailed questionnaire as compared to the results obtained through personal interviews;

(b) to provide the Department of Labor with data on potential survey methods and workable definitions of training activities to be used in forthcoming surveys and analyses of private training.

2. Efforts to Obtain Data on Company Training

In spite of the growing interest in private industrial training and the obvious need for data on such programs if they are to be expanded through public and private means, the data presently available on such programs are not only scanty, but also impressionistic and generally unreliable. Previous attempts to obtain information on training practices in business and industry were inconclusive. An initial attempt at a nationwide survey was made in 1962 by the Bureau of Apprenticeship and Training (BAT) employing a 1 percent probability sample of companies by industry.[1/] Information was obtained through a mail questionnaire sent to approximately 9,600 establishments. After a second and third follow-up, more than 85 percent of those surveyed responded. The questionnaire was a short two-page schedule asking employers to report the number of

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1/ U.S. Department of Labor, Bureau of Apprenticeship and Training, Training of Workers in American Industry, Research Division Report No. 1, 1962.

employees, the number of current trainees, the numbers and occupations of employees in each training program, training facilities, and techniques used to encourage employee training. Inflation factors were used to blow up the sample in order to estimate national data.

Although fairly precise data were reported on the number of establishments with formal training and the number and types of trainees by industry and occupational categories (discussed further in Chapter II), further investigation raises questions about the validity of some of the conclusions. Personal interviews have indicated that the definitions of training must be clearly spelled out if employers are to make consistent and comparable responses to questions concerning on-the-job training. As is noted below, different employers apply varying degrees of rigor in assigning the term "training" to a process of skill acquisition. Whereas some employers tend to view "learning by doing," with occasional guidance from foremen or fellow employees, as training, others reserve the term "training" for more formal instructional programs. Even the definition of "formal training" is by no means consistent among employers. And in reporting on formal training programs, as in the BAT survey, the various informal methods of skill acquisition, which may be dominant, are essentially bypassed.

In an effort to overcome some of these deficiencies and to update the information obtained from the earlier BAT study, the Department of Labor made a tentative decision in the Spring of 1969 to implement another comprehensive study of private company training activities. As a preliminary step, the Center for Studies in Vocational and Technical Education at the University of Wisconsin was asked to determine the feasibility of gathering useful data in a nationwide mail survey of employers. Graduate students in Economics and Industrial Relations conducted approximately 250 interviews with employers across the nation. In addition to the detailed personal interviews, experiments were conducted in which employers were asked to return mail questionnaires.

The results of this feasibility study led logically to the present case study of company training practices. The conclusions of the feasibility study advised against exclusive reliance on a mail questionnaire to obtain reliable data on company training.[2/] It was found that only limited data were available on the number and type of trainees, the kind and duration of training, and the costs of training in a large proportion of the surveyed firms. Only the larger firms (that is, over 2,000 employees) indicated that they would respond to a detailed mail questionnaire, and there was a meager response from those employers who were asked to return a mail questionnaire with specific data following the personal interview. Moreover, the interviewers found serious definitional problems, especially concerning the meaning of on-the-job training, which would hamper the efforts of employers to provide reliable training data by mail even if they were able and willing to do so.

As an alternative to exclusive reliance on a nationwide mail survey, the feasibility study recommended a simplified personal interview directed to a relatively small sample of large firms, buttressed by an abbreviated mail questionnaire to be sent to a larger national sample. It was further recommended that the questionnaires be differentiated and tailored to the characteristics of specific industries.

Based upon the results of the feasibility study and other considerations, the Advisory Group for the Department of Labor training study recommended postponement of a nationwide survey pending additional exploratory and pilot efforts. One such project, being conducted by the Bureau of Labor Statistics in metalworking plants and public utilities, is experimenting with mail questionnaires for some firms, followed up by personal interviews with respondents and non-

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[2/] Gerald G. Somers with the assistance of Myron Roomkin and others, The Availability of Data on Company Training Programs: A Feasibility Study (Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, June 1971).

respondents to the mail survey. A diary approach is also being used to gather information on a weekly or payroll basis for 13 weeks for an additional group of firms. The pilot case study discussed in this report is also part of the exploratory work which will precede a nationwide survey.

3. Efforts to Obtain Information on Skill Acquisition

The major drawback to a survey of employers is that it can usually provide only limited information on the various routes by which employees acquire skills. Since many workers come to a company with previous experience or training and pick up additional skill through a variety of informal methods, the worker himself may be the only source of information on the total process and extent of skill acquisition. The first nationwide survey directed to workers in an effort to obtain information on skill acquisition was conducted in 1964 by the Office of Manpower Research of the U. S. Department of Labor's Manpower Administration.[3/] This survey was directed to workers between the ages of 22 and 64 who had completed less than three years of college. It was found that only about 40 percent of the craftsmen had acquired the skill for their current jobs through formal training, including apprenticeship and vocational courses. Almost 40 percent of all craftsmen surveyed stated that they felt that on-the-job learning was more effective than formal training. It was apparent from this national survey that most of the craftsmen had simply "picked up" the necessary skills through exposure to a variety of work experiences on the job.

Even though the 1964 study provided useful insights into the processes of skill acquisition, the survey schedule was not sufficiently detailed to provide data on the duration of various types of skill acquisition and the differences in employment benefits resulting from the various processes. Utilizing a more

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[3/] Formal Occupational Training of Adult Workers (Washington: U. S. Department of Labor, Manpower Administration, December 1964).

detailed survey instrument, the longitudinal labor market studies being conducted at Ohio State University provide additional useful information on the processes of skill acquisition. These studies report that only 12 percent of the young white men 14 to 17 years of age and 15 percent of the blacks were enrolled in vocational and commercial curricula.[4] Some 2.4 million of the 4.5 million young white men with 12 or fewer years of education and not enrolled in school had no vocational training other than what they may have acquired during their formal schooling.

These surveys of workers and potential workers provide information on skill acquisition not obtainable from employers. However, the data would be even more useful if the worker's response could be related to that of the company in which he is employed. A full and reliable picture of training and skill acquisition can best be obtained through related employer and employee responses.

The most careful survey along this line, leading directly to the research reported here, is the study by Morris A. Horowitz and Irwin L. Herrnstadt of the training of tool-and-die makers.[5] The authors interviewed 400 tool-and-die makers and over 60 foremen in more than 50 metalworking and fabricating plants in the Boston area. In an effort to determine the paths of education, training, and job experience that produced skilled workers, the authors also interviewed managerial personnel, educators, public officials, vocational high school seniors, and new job entrants in metalworking and fabricating establishments in the Boston area.

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[4] Career Threshholds: A Longitudinal Study of the Educational and Labor Market Experience of Male Youth, Volume I (Washington: U.S. Department of Labor, Manpower Administration, 1970).

[5] Morris A. Horowitz and Irwin L. Herrnstadt, The Training of Tool and Die Makers (Boston: Northeastern University, 1969). For an adaptation, see Learn-the Tool and Die Maker Trade (Washington: U.S. Department of Labor, Manpower Administration, 1970).

The Horowitz-Herrnstadt study identified six routes by which men become tool-and-die makers: on-the-job training, vocational high school, picking up the trade, apprenticeship, vocational high school plus on-the-job training, and vocational high school plus apprenticeship. They were careful in their definitions of these alternate paths. Although the two most common routes to skill development were on-the-job training and vocational high school, each of the paths had a substantial number of followers. Older tool-and-die makers were generally trained at work, whereas the younger members of the trade were more likely to have had systematic training in vocational high school. However, the largest proportion of men received their training in the firm either through on-the-job training, apprenticeship or picking up the trade. A critical finding of the Horowitz-Herrnstadt study was that there were no important differences in the competency of the tool-and-die makers produced by the various training paths. Equally important was the men's widespread complaint that they received little or no occupational guidance at the time they were forced to choose an educational or training program.

The research reported here has borrowed much from the objectives and methods of the study of tool-and-die makers in the Boston area. If much can be learned about the process of skill development for one skilled manual trade through the survey techniques adopted by Horowitz and Herrnstadt, it was felt that useful additions to knowledge could also be made by extending this type of survey to all trades in a particular establishment. At the same time, further light could be shed on the most appropriate methodology for ascertaining data on company training programs and the process of skill acquisition within industry.

4. The Remaining Chapters in this Report

As further background for an understanding of the objectives and techniques adopted in the current research, Chapter II presents a summary statement of

current information on industrial training and the gaps in knowledge which remain.

In Chapter III there is a description of the company which served as the site of the case study as well as a description of the labor market in which it was located. The methodology of data retrieval and analysis is also discussed in this chapter.

Chapter IV presents an overview of training programs in the company, including the history of training and the rationale for training provided by company officials. This chapter also contains a description of current training techniques and characteristics.

The sources of skill acquisition of employees in the company are analyzed in Chapter V. The paths used by the employees at the time of their entrance into the company and at the time they reached their highest rated job in the company are described and measured. An effort is made to analyze the correlates or determinants of each path and to correlate the paths followed before and after entrance into the plant.

In Chapters VI and VII the benefits and costs of training are estimated by relating the various methods of skill acquisition to employee earnings, occupational levels, the time needed to reach competence on the job, and upward labor mobility. Costs are discussed primarily in terms of the training costs incurred by the company.

Since the company closed shortly after the research survey was initiated, the research investigators were given an opportunity to determine the transferability of skills to alternative employment. The post-shutdown employment experience of the former employees is discussed and analyzed in Chapter VIII.

In Chapter IX there is a discussion of alternative methods of studying training and skill acquisition in business and industry. Guidelines are recommended for a national survey based upon the lessons learned from the pilot case study

and other exploratory studies. A comprehensive summary of the findings as well as more general policy conclusions are presented in Chapter X.

CHAPTER II

TRAINING IN INDUSTRY: THE PRESENT STATE OF KNOWLEDGE

1. Some Theoretical Considerations

Why do workers choose a particular training path and what are the results of that particular choice for the worker, the company, and the labor market? Traditional economic theory, with its stress on homogeneous labor markets and mobility between firms, provides only partial answers to these questions. Skill acquisition improves productivity, and increased productivity leads to higher wages as competitive theory would suggest. However, only indirect inferences can be drawn from competitive theory in answering the questions of choice between skill paths and the relative costs and benefits of alternate paths.

Two recent theoretical emphases provide greater insights into the questions raised in this research. First, the theory of human capital provides a basis for understanding the choice of modes of skill acquisition and the consequences for the worker, the company, and society of the training route followed by the worker or adopted by the company. The application of human capital theory in cost-benefit analyses of investments in human resources gives a basis for measurement of the results of alternative choices in skill acquisition.[1/]

A second promising theoretical development for understandint the problems of the current research is the concept of the "internal labor market." The spate

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[1/] Although the literature on human capital has burgeoned in recent years, the best overall treatment is still probably that of Gary S. Becker, Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education (New York: Columbia University Press, 1964). The theoretical application to on-the-job training is developed specifically by Jacob Mincer in "Investment in Human Beings," Journal of Political Economy, Supplement, 70 (October 1962). A good recent summary of the state of the art is that by Lester C. Thurow, Investment in Human Capital (Belmont, Calif.: Wadsworth Publishing Co., 1970). Theoretical and practical applications of cost-benefit analysis to manpower training and other manpower programs are discussed in G. G. Somers and W. D. Wood,eds., Cost-Benefit Analysis of Manpower Policies (Madison: Center for Studies in Vocational & Technical Education, University of Wisconsin, 1969).

of mobility studies which occurred in the years shortly following World War II demonstrated the relative immobility between firms of most adult male workers. Most men, after achieving some degree of seniority in a firm, are not really in the external labor market at all, in the sense of actively looking for jobs elsewhere. Their interest in mobility and actual job movement is essentially within the firm, from one occupation to another, and, hopefully, up the promotional ladder. The knowledge of internal labor markets has recently been more fully developed in analytical and practical terms.[2/]

Building upon the earlier mobility literature and later work by John Dunlop and by Doeringer and Piore have provided a full-scale model of the origins, character, and consequences of internal labor markets. They find the origin in skill specificity, on-the-job training, and custom at the work place. Gary Becker had emphasized the important distinction between "specific training" and "general training." Training which is completely specific to the firm is, in Becker's terms, "training that has no effect on the productivity of the trainees that would be useful in other firms." On the other hand, Becker notes that "completely general training increases the marginal productivity of trainees by exactly the same amount in the firms providing the training and in other firms."[3/] Internal labor markets develop not only because specific training ties workers to the firm, but specific skills, often resulting from specific training, also make it increasingly difficult for the worker to utilize elsewhere the skills he has acquired within a particular firm.

Doeringer and Piore note the difficulty in defining on-the-job training. Its very informality makes it difficult to identify the precise nature of the

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[2/] See especially Peter B. Doeringer and Michael J. Piore, Internal Labor Markets and Manpower Analysis (Lexington, Mass.: D.C. Heath Co., 1971); and Charles A. Myers, The Role of the Private Sector in Manpower Development (Baltimore: The Johns Hopkins Press, 1971).

[3/] Becker, Human Capital, p. 18.

process. They note, however, that it is a process that is variously described as "osmosis," "exposure," "experience," or "working one's way up through promotion."[4] However, in spite of the difficultires of definition and identification, Doeringer and Piore note the crucial role played by on-the-job training in bringing about skill specificity, which in turn establishes and defines the boundaries of the internal labor market.

Finally, custom at the work place is an unwritten set of rules based upon past practice or precedent, in the view of Doeringer and Piore. The customary law which emerges is important in the development of internal labor markets because it is a stabilizing force which results in rules at the work place and which governs the pricing and the allocation of labor within the internal market.

The structure of a firm's internal labor market is determined by the technology of its production, the demand for its product, and the relationship with the external labor market. Technological processes will dictate the occupational hierarchy within the firm and establish the "ports-of-entry" into the firm from the external labor market. Customarily, the ports-of-entry will be concentrated in the lowest jobs, but workers may enter the internal labor market at various levels of the occupational hierarchy. They will enter at higher levels when extensive training and/or education is required for craft, technical, professional, or managerial positions. The productive process and the occupational composition will establish the basic structure of the internal labor market; and custom, reinforced by union-management agreements on seniority and training, will make it difficult to depart substantially from the basic structure.

However, changes in the structure of a firm's internal labor market, including the ports-of-entry, will inevitably occur under the pressure of changing demands for the firm's product and the emergence of shortages and surpluses of

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[4] Doeringer and Piore, Internal Labor Markets, p. 18.

labor in the external labor market. Even though new employees customarily join the firm only in the lowest-entry jobs, an upsurge of demand for the firm's product and for labor will force open additional ports-of-entry. Except for those high-level jobs requiring extensive outside training or education, employees at the entry-level will customarily be promoted to higher occupations as vacancies develop. They will acquire the needed skills through some combination of training and learning on the job. If the firm's demand for labor increases suddenly and substantially, however, the customary upward allocation of labor within the internal market may be diluted in favor of increased hiring from the external labor market at various occupational levels. When existing employees are fully employed and enjoying overtime work as a result of the surge in demand, their resistance to change in the customary processes of training and promotion would be diminished.

Changes in supply and demand in the external labor market will also affect the allocative structure and ports-of-entry in the firm's internal labor market. If the upsurge in demand for labor and resultant shortages in the surrounding labor market, it may not be possible for the firm to meet its skill requirements through additional hiring from the outside. Then the firm has no recourse but to expand its own training efforts. Under conditions of general labor shortage, firms may be forced to engage in extensive on-the-job training even when such training is not specific to the firm; the firm's losses resulting from the exit of trained workers from the internal labor market may be recouped by the active "pirating" of trained workers from other firms. The notable increase in labor turnover which occurs in a period of general labor shortage leads to the conclusion that many firms must lose their investment in the training of workers in such a period.

Declines in a firm's demand for labor and a recession in the external labor market established by the customary processes of productive technology. With

few vacancies arising within the internal labor market, the need for training and promotion is reduced. Ports-of-entry and hiring from the outside are also likely to be reduced, and, given the insecurity of the workers in such a period, grievances would probably arise if outside hiring occurred for any but the most skilled jobs.

Although traditional economic theory would indicate that employers react to shortages and surpluses of labor by altering wage rates, union-management agreements and other customary forces militate against significant wage changes to meet the problems of labor demand within the firm. Firms are more likely to meet a labor shortage by altering hiring standards, skill requirements, training programs, and other allocative features of the internal labor market.

Training and the Theory of Human Capital

The structure of the internal labor markets, as influenced by technology, product demand, and the relationship to external labor markets, will help determine the investments made in human capital by employees, employers, and society. Professional and technical occupations require extensive education and training which are borne primarily by the employee and by society. Although the acquisition of such high-level skills involves substantial cost on the part of the student, in the form of tuition and forgone earnings, society also supports a considerable portion of this investment through its tax contributions to higher education. The employer's investment in education and training for professional and technical workers is usually small relative to that of society and of the employee himself. However, as is noted below, additional investments may be made by the employer to update professional and managerial skills through short courses and release for lengthier periods of additional education. It is likely that the employer reaps much of the benefits of the investment in human capital made by society and employees in professional and technical occupations.

Skilled workers may also make a large investment in their own training.

Although the tuition costs of vocational education are relatively low, the opportunity costs (that is, the forgone earnings) of two or more years of training beyond high school may be considerable. Similarly, employment of an apprentice at wages below those of a journeyman for a number of years will reflect the opportunity costs of the apprentice's skill acquisition. The extent to which skilled workers can transfer some of these costs to the employer by reducing their pre-employment formal training will depend upon the factors noted above which influence the structure of internal labor markets. The shift of the investment costs of skill acquisition from employee to employer is likely to depend not only upon the particular occupation, but also upon the demand for labor and the supply-demand situation in the external labor market.

Unskilled and semiskilled workers are likely to enter the internal labor market at the lowest ports-of-job-entry. Their own investment in skill acquisition has been minimal, and the primary investment will be made by the employer as the new entrants acquire skill through some combination of training and learning on the job. Whether the returns on the investment will accrue primarily to the employer or to the employee will depend upon the specific or general nature of the training and upon the resultant retention or loss of the employee within the internal labor market.

When we look upon the worker's income-producing skill and knowledge as his human capital, we are enabled to calculate costs and returns of the alternate paths to skill acquisition. The worker's income-producing skill and knowledge is similar to an investment in a machine which results in a future flow of output and income for the businessman. So does the investment in training in skill acquisition provide a future flow of earnings for the worker. There are costs involved in the investment in a machine, and the businessman who sells the produce of that machine can calculate a rate of return on his investment. Similarly, there are costs of investing resources in the training and skill acquisition of

workers. Such skill acquisition, which generates productive contributions for society, is a costly investment for the individual, the employer, and/or society. It is possible to calculate a rate of return on the investments in training and skill acquisition by relating the costs of such skill acquisition to the flow of future benefits that result from the productive contributions.

Although the data available to the research investigators in this study are not sufficiently precise to permit a full-fledged benefit-cost analysis of the investment in various training paths, an effort to utilize this tool of analysis is made in Chapters VI and VII. The returns to employees, employers, and society are seen to be influenced in a complex manner by the relationship of the firm's internal labor market and the external labor market.

Within the limits set by technology, supply and demand in product and labor markets, and the training institutions and opportunities in the community, the employee and the employer can exercise some discretion concerning the modes of skill acquisition to be adopted and, consequently, the share of the costs of training to be assumed. Although, ceteris paribus, each party would prefer to shift the costs of training to the other or to soceity, the shift in costs may very well entail some shift in benefits as well. Thus, an employee who chooses to enter the firm after having invested a minimum amount in his own skill acquisition is doomed to enter at the lowest level in the occupational hierarchy, and he has no assurance of a rapid rise in status and earnings. An employer who insists on hiring fully trained and fully skilled workers may be able to do so only at a high price, and the wage paid to the highly trained new entrants may be forced upon him as a pattern for the existing work force in that occupational category. The employer has some discretion in the types of training programs he will introduce, and by changing job design and job breadth, he can influence the degrees of general or specific training to be received by the employees. This employer decision will determine, in turn, the share of the benefits of training

to go to the employer and to the employee. Whereas the employee may prefer to shift the costs of training to the employer by postponing his skill acquisition until he has been hired, he may suffer a loss of benefits from this training because of the employer's desire to fit the training to the specific needs of his company. Society's preference may be for the most general type of training which can be readily transferred to other firms and other industries. However, this societal preference for general training may be partially sacrificed in efforts to induce private employers to assume a greater share of training costs through the administration of on-the-job training programs.

Thus, within a given set of environmental constraints, employees, employers, and society will have preference curves representing the desired paths of skill acquisition. If these preference functions are exercised in a purely rational manner, costs will be carefully weighed against benefits, and rates of return will be determined for each of the parties for each of the alternative training paths. It is possible to develop a theoretical model in which the preference functions of employee, employers, and society are joined in a given environmental context to determine the degree of institutional or on-the-job training and the degree of general or specific training.[5/]

2. Empirical Studies of Industrial Training

Although there have been numerous descriptions of company training programs and many ad hoc appraisals of training in particular firms, detailed data on the extent of training within industry by occupation in industry are still scanty, and rigorous evaluation of company training programs are even more scarce.

The Extent of Company Training in Skill Acquisition

[5/] For an interesting discussion along these lines, see James G. Scoville, "A Theory of Jobs and Training," Industrial Relations, 9 (October 1969), pp. 36-53.

The principal data on the training of workers in the 1960s have been forthcoming from government agencies under the Manpower Development and Training Act (MDTA). However, these data relate primarily to institutional training in vocational schools and skill centers rather than to training on the job within industry. Even though on-the-job training, supported by federal financing, has played a progressively larger role under MDTA in recent years, it is notable that the data for on-the-job training are much less detailed and less reliable than the information on institutional training.[6/] The federal subsidies to on-the-job training for disadvantaged workers under the National Alliance of Businessmen (NAB-JOBS) have resulted in some statistical data on this type of training. However, the overall data on NAB-JOBS on similar programs are incomplete and confused because the reports include both subsidized and nonsubsidized employers. Nonsubsidized employers, who hire and train the disadvantaged without government support, frequently see even less reason than do subsidized employers for reporting the details of their training programs. Even if the on-the-job training programs carried out under MDTA were reported in full detail, they would provide only a fractional picture of company training programs in the United States at the present time. Even in the absence of data, it can be assumed that on-the-job training under government auspices represents a small percentage of the country's total on-the-job training.

Reference has been made in Chapter I to the two national surveys of company training and skill acquisition conducted by the U.S. Department of Labor in the early 1960s. As was noted above, the nationwide survey conducted in the spring of 1962 by the Bureau of Apprenticeship and Training lacked a precise definition of on-the-job training which would distinguish it from simply "learning by doing"

6/ Statistical detail on institutional and on-the-job training under MDTA and other government programs can be found in U.S. Department of Labor, Manpower Administration, Manpower Report of the President (Washington: U.S. Government Printing Office, 1971).

a particular job. Since the data provided are now ten years old, they cannot present an accurate quantitative picture of training in the United States at the present time. For these reasons, the precise data reported in the 1962 survey are of less interest than the general magnitudes and proportions. In these general terms, the major findings of the study were as follows:[7/]

1. Of the 711,000 establishments responding to the survey, only one of every five sponsored some type of formal training. Training programs, as defined in the survey, included any prearranged formal system of instruction sponsored by the employer or by employer-union agreement and designed to better equip employees to perform their current or future job duties. It included instruction for employees both on and off the job site.

2. Of the 37,000,000 workers employed in the responding establishments, only 2.7 miooion were actually enrolled in an employer-sponsored training program.

3. The larger the establishment, the greater was the probability that a training program was in operation. Larger and smaller establishments tended to emphasize different types of programs. Larger establishments emphasized training for management, employer-subsidized training in educational institutions, and training in broad fields such as the sciences, engineering, and technology. The smaller establishments emphasized training in the skill crafts, in tool or machine operations, and for specific skills in sales, office, and other white-collar work.

4. Most of those reported as trainees were enrolled in safety or orientation programs, and only 1.5 million of the trainees were in other types of programs. Of this number, those enrolled in programs involving a fairly specific industrial skill numbered fewer than 400,000. Thus, even among those who were classified

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[7/]U.S. Department of Labor, Bureau of Apprenticeship and Training, Training of Workers in American Industry, Research Division Report No. 1, 1962.

as trainees by the responding employers, the development of new skills or the enhancement of existing skills was only incidental.

5. The largest groups of trainees were production workers (almost one-half million), followed by managers, supervisors, and foremen; craftsmen; apprentices; and sales workers.

6. More than 58,000 training programs in the skill trades were conducted in the 142,000 establishments which sponsored some type of training. Almost one-third of all establishments which sponsored training included apprentices in their programs. The largest number of apprentices were enrolled in plumber or pipefitter, electrician, or machinist programs.

The limited picture of skill training in industry presented by the 1962 survey raises some serious methodological questions when compared with results of the national survey of workers' skill acquisition conducted by the Office of Manpower Research of the U.S. Department of Labor's Manpower Administration in 1963.[8/] This survey gives training a more important role in the process of skill acquisition, but it is notable that the workers responding to the national survey stressed the importance of on-the-job training rather than formal training in a classroom context, either on or off the company premises. Only 30 percent of the sample of respondents had learned their current job through formal training programs (including schools, full-time company training, classes of at least six weeks' duration, apprenticeship programs, and training in the armed forces). On the other hand, 56 percent had learned the skills required for their current jobs through informal on-the-job training. As noted in Chapter I, even among the craftsmen who responded to the survey, only about 40 percent had acquired their skills through formal training.

When the two national surveys are compared, it seems clear that the definition

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[8/] U.S. Department of Labor, Manpower Administration, Formal Occupational Training of Adult Workers (Washington: December, 1964).

of "training" used in the questionnaires directed to employers was much more restrictive than the definition of "training" used in questioning employees about the mode of their skill acquisition. A majority of the workers felt that they had learned their skills through training--the informal type of instruction involved in on-the-job training. When told to define training as "any prearranged formal system of instruction," employers obviously excluded much of the on-the-job training which employees cited as their principal means of skill acquisition.

The relative importance of informal on-the-job training, especially in manufacturing industries, is substantiated by a number of more specific and localized studies. In a study of 150 firms in Milwaukee, conducted by Richard Perlman for the Center for Studies in Vocational and Technical Education at the University of Wisconsin, it was found that only six firms had formal training programs. In the other firms, necessary skills were acquired as part of the process of work experience, ranging from somewhat formal on-the-job training to casual instruction from foremen or fellow employees while the worker "learned the job while doing it."[9/] Charles A. Myers and Doeringer and Piore, reviewing a number of studies of company training in addition to their own research, also find that in the U.S. and in other industrialized countries, the majority of workers, even in skilled crafts, acquire their skills through the informal process of on-the-job training rather than through formal classroom instruction.[10/] As noted in Chapter I, Herbert Parnes also found a relatively small proportion of young men enrolled in formal vocational programs.[11/] Like the adult workers covered in other surveys,

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9/ Richard Perlman, On-The-Job Training in Milwaukee--Nature, Extent, and Relationship to Vocational Education (Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1969).

10/ Doeringer and Piore, Internal Labor Markets; Myers, The Private Sector in Manpower Development.

11/ Career Thresholds: A Longitudinal Study of the Educational and Labor Market Experience of Male Youth, Volume I (Washington: U.S. Department of Labor, Manpower Administration, 1970).

these young men will clearly be forced to find whatever skills they later acquire on the job. The findings of John Iacobelli in the Cleveland area gives further support to the crucial role played by the on-the-job skill acquisition as contrasted with the formal vocational or classroom instruction for production workers.12/

Because of the importance of on-the-job training and its relevance to the analysis of training in this case study, it is useful to summarize the nature of on-the-job training observed by Doeringer and Piore in their survey of 75 companies, primarily in manufacturing, during the period 1964 to 1969. They note that very often on-the-job training is not recognized as a distinct process at all. For jobs requiring little skill, new workers are often given only a brief introduction to the job before beginning to perform as productive employees. They then receive occasional guidance from the foremen or from fellow workers. The more complex the job, the greater the formality of on-the-job instruction. In sum, the new employee may serve as an assistant to an experienced employee and this becomes formalized in apprenticeship programs. However, even for many fairly skilled production jobs, employees are expected to have learned the rudiments from a previous job which is lower on the occupational ladder. The difficulty in defining and measuring on-the-job training is seen in the fact that many workers learn higher-skilled jobs simply by observing their neighbors, by practicing on the more complex machines during lunch hours or coffee breaks, and by asking questions of foremen and neighboring machine operators.

Doeringer and Piore note that training typically occurs in the process of production, partly through trial and error. When instruction is required, it is usually provided by a supervisor, by the incumbent worker on the job to which

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12/ John L. Iacobelli, "Training Programs of Private Industry in the Greater Cleveland Area" (Ph.D. Thesis, Department of Economics, University of Texas, 1969).

the "trainee" aspires, or by other workers on neighboring jobs. Many experienced employees feel it to be their responsibility to demonstrate new tasks to novice workers. Superiors may delegate some of their tasks and, occasionally, the "trainee" will fill in for the skilled worker when the latter is forced to be absent from his job for short periods of time. The novice will seldom perform all of the tasks of the higher-skilled occupation during the learning process, and the more complex aspects of the job will be performed by the experience employee until the novice is able to assume full responsibility.

Doeringer and Piore note that because this informal process of learning job skills seems "natural" in the eyes of both management and workers, it is often deemed to be costless by management and little attention is paid to the training process in most companies. However, the participants in the training process assume dual roles: one in the production process, as supervisors or subordinates, and the other in the learning process, as instructors or students. Thus, on-the-job training may be more economical than formal instruction, but it is an error to think of such training as being without cost. It may involve wasted material, machine damage, reduction in product quality, and sacrifices of the productivity of both trainee and the instructor-foreman. Unfortunately, these costs are difficult to separate from the overall costs of production, and most companies do not even attempt to make such a distinction.[13/]

The definition of on-the-job training is crucial to statistical measurement of the extent of training in industry as a whole, as well as in the comparisons of the extent of training between firms of varying size and varying industrial classification. Using a somewhat restrictive definition of training, "any pre-arranged formal system of instruction . . . both on and off the job site," the national survey of 1962 found that only 20 percent of the establishments sponsored

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[13/] Doeringer and Piore, Internal Labor Markets, pp. 17-22.

one or more formal training programs, and that the percentage of establishments with training programs varied directly with their size. Training programs were found in only 11 percent of the smallest establishments (4-19 employees), in 25 percent of firms with 20-99 employees, and in 96 percent of firms with 5,000 or more employees. In medium-sized firms (500-999 employees), 70 percent had training programs.[14] A similar concentration of training programs in large firms was found in the national study carried out at the University of Wisconsin, in which a careful attempt was made by interviewers to determine whether so-called on-the-job training actually involved some expenditure of time by supervisors or fellow employees.[15] On the other hand, in one New England study, two-thirds of the small firms (8-49 employees) reported training, mostly on the job.[16] Since some employers will classify any "learning on the job" as training, it is clearly difficult to compare the extent of training as measured by different studies without having a common definition of on-the-job training.

Apprenticeship and Skill Training

The U.S. Department of Labor maintains detailed records on registered apprentices, by trade and training status. Thus, it is indicated that the number in apprenticeship training in all trades increased from almost 193,000 in 1947 to almost 274,000 in 1969. Whereas only 7,300 had completed their apprenticeship training in 1947, 39,600 completed their apprenticeships in 1969. Similar detail is available for the construction trades, the metal-working trades, and the printing trade, taken separately.[17] Since apprenticeship training is primarily

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[14] Training of Workers in American Industry, p. 5.

[15] Gerald G. Somers, The Availability of Data on Company Training Programs: A Feasibility Study (Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, June 1971), p. 3.

[16] "Industrial Investment in Manpower," New England Business Review (February 1965), pp. 1-5, quoted in Myers, The Private Sector in Manpower Development, p. 13.

[17] Manpower Report of the President (1971), p. 315.

a form of on-the-job training in industry (in addition to related instruction taken in the schools), the data on registered apprentices constitute an important source of information on training in business and industry. However, as noted earlier, formal apprenticeship represents only a minor means by which craftsmen and other skilled workers attain their skilled status. The 1963 Department of Labor survey found that only 40 percent of the craftsmen and kindred workers had formal training (schools and apprenticeship programs). Other studies have found that even in the building trades there is no craft in which apprenticeship is the only route to entry or to journeyman status. In one large northeastern city, only one-third of the new journeyman plumbers each year had completed the formal apprenticeship training program. The remainder were nonunion men who obtained local licenses. Amoung electricians in this city, approximately 50 percent entered journeyman status through the formal apprenticeship route. A study of construction labor supply in upstate New York found that 21.5 percent of 784 craftsmen (bricklayers, carpenters, electricians, and operating engeineers) indicated that their only source of skill was informal on-the-job training in construction.[18/]

In manufacturing and other industries outside of building construction, the alternative routes to apprenticeship for skilled craftsmen are apparently even greater. In his survey of private training programs, Charles Myers concludes that ". . . the extent of formal apprenticeship is probably limited to large firms, and accounts for only a small percentage of the total trainees in manufacturing."[19/]

As was noted in the preceding chapter, the most exhaustive study of alternative paths for skilled craftsmen is that by Horowitz and Herrnstadt in the Boston

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[18/] Myers, The Private Sector in Manpower Development, pp. 16-17.

[19/] Ibid., p. 19.

area. Their study was restricted to tool-and-die makers. In their interviews with 400 tool-and-die makers in more than 70 metal-working and fabricating establishments, they found the following distribution of training paths in achieving skilled journeyman status:

Training Path	Percent Distribution of Workers
On-the-job training	22.5
Vocational high school	22.3
Picking up the trade	15.5
Apprenticeship	14.3
Vocational high school plus on-the-job training	11.3
Vocational high school plus apprenticeship	9.8
Miscellaneous	4.3

The study of tool-and-die makers in the Boston area also contained a wealth of detail with regard to the characteristics of the trainees and the time distribution of the alternate training paths. Thus, it was noted that for men who began their training before 1930, apprenticeship and vocational high school were important. Over 57 percent of the sample followed either one or a combination of these two formal routes. In the depression years of the 1930s, formal vocational schooling, sometimes followed by apprenticeship, increased in importance, but only eight percent of the tool-and-die makers trained in that decade used only apprenticeship as a means of acquiring their skills. Employment was scarce and schooling was prolonged. During the World War II period of intense labor shortages, formal methods of training were further reduced, with the apprenticeship path being followed by only 8.5 percent of the tool-and-die makers trained in that period and with formal vocational schooling dropping to 11.3 percent of the trainees. On the other hand, of the tool-and-die makers who acquired their skills in the war period, 36.6 percent utilized on-the-job training and 28.2 percent "picked up the trade." In the postwar years, on-the-job training and other informal methods declined, but not to their prewar levels. Formal training paths, such as vocational schooling and apprenticeship, regained some of their earlier importance. By

the 1960s, the distribution of training paths has assumed a distribution similar to the pattern tabulated above.[20/]

Horowitz and Herrnstadt also indicate the extent to which tool-and-die makers who had followed various training paths to acquire their skills had taken some kind of supplementary training. Over half of the men had taken some kind of supplementary training. Over half of the men had taken part-time courses, and there are only small differences with regard to supplementary training among the training paths. Of even greater importance was the working experience by which men picked up important aspects of the tool-and-die trade that their other training could not or did not impart. Supplementary "picking up the trade" was emphasized by 71.8 percent of the tool-and-die makers whose training paths were in one of the other categories. There were no significant differences in the incidence of this supplementary method among the various other training paths. The authors indicate that 90 percent who had picked up part or all of the trade by this informal means considered this method of great value for attaining their current level of proficiency. No other training method received such an endorsement.[21/] Because of their close relationship to the focus of this study, the findings of the Boston study of tool-and-die makers will be discussed further in subsequent sections of this report.

Myers reports similar alternatives to the apprenticeship route for other trades and other industries. For example, apprenticeship in air transportation is only one of the routes to crafts jobs, the other two being private vocational and on-the-job progression from semiskilled jobs.

[20/] Morris A. Horowtiz and Irwin L. Herrnstadt, The Training of Tool and Die Makers (Boston: Northwestern University, 1969), pp. 109-125.

[21/] Ibid., pp. 138-140.

On-the-Job Training of the Disadvantaged

As was noted earlier, there was increased interest during the 1960s in training the disadvantages, primarily those in the poverty income category from racial minority groups. Although the principal federal thrust at the beginning of the decade was through institutional training, on-the-job training in private firms played a growing role by 1970. The governmental role through the MDTA and, later, through NAB-JOBS supplemented many private programs for hiring and training the disadvantaged which were carried out by employers without government subsidy.

Unfortunately, there are only scattered quantitative data on the non-governmental on-the-job training programs and even the statistics for the governmental programs provide less detail than one would wish for a full assessment. Although there have been a number of reports and case studies on training programs for the disadvantaged in companies such as Ford, Chrysler, Lockheed, Western Electric, IBM, Xerox, General Electric, Boeing, Eastman Kodak, Westinghouse, United Airlines, and Bankers Trust Company, they provide only a hint as to the quantitative scope of such private training. Most of the large and nationally prominent employers have instituted some special program for hiring and training black and other minority workers. But we can only conclude, along with Charles Myers, that "quantitatively, it is difficult to determine how important these effects to hire more disadvantaged workers have been."[22/] A simple aggregation of the numbers reported in public reports and case studies would be misleading. On the one hand, such an aggregation would miss many firms whose programs have not been publicized. On the other hand, since the programs vary greatly in content and since the definitions of "training" and the "disadvantaged" differ considerably in company reports, the publicized figures may given an exaggerated picture of the actual training of disadvantaged workers in the reporting companies.

22/ Myers, The Private Sector in Manpower Development, p. 30.

These problems of quantitative measurement of on-the-job training for the disadvantaged are apparent even for the government-sponsored programs. Under the MDTA, only 2,000 of the 34,000 enrolees in 1963 were in on-the-job programs as compared with institutional training. By 1970, it was reported that 91,000 of the total 221,000 enrollees were trained on the job. For the total period, 1963-70, it was reported that there were 473,000 on-the-job training enrollees as compared to 978,000 institutional trainees under MDTA.[23/]

Because employers participating in MDTA's on-the-job training programs were required to file reports on enrollees, there are detailed statistics on the characteristics of workers trained under this system. However, it is reported that only 52 percent of the trainees were "disadvantages" and only 48 percent were in a "poverty status" in 1970 and throughout the 1963-70 period. More than two-thirds of the on-the-job trainees were shite.[24/] Thus, even if we had a universally-accepted definition of "disadvantaged," almost half of the on-the-job trainees would be found outside of this classification. It would be difficult to distinguish these trainees from other employees who might be trained by the same companies without a government subsidy. Therefore, we can only conclude that the 91,000 on-the-job trainees under MDTA in 1970 represented some unknown proportion of all on-the-job trainees in industry in that year and that the characteristics of a large proportion of the 91,000 trainees could not be distinguished from workers who might normally be trained on the job in private company training programs.

The limited success of the on-the-job training program under MDTA led to the establishment of the National Alliance of Businessmen's Job Opportunities in the Business Sector program (variously known as the NAB-JOBS or the JOBS

[23/] Manpower Report of the President, 1971, p. 302.

[24/] Ibid., p. 305.

program) at the end of the decade. Under this program, private firms signed contracts with the Department of Labor under which the Department would provide hiring and training subsidies, initially averaging around $3,300 per disadvantaged employee, but more recently about $2,200. Employers were also encouraged to sign voluntary pledges for hiring and training the disadvantaged under which there would be no government subsidy. The number of trainees involved in this program has become a matter of heated debate. The announced goal in 50 major cities was 100,000 jobs for the disadvantaged by June 30, 1969, and 500,000 by June 30, 1971. The number of cities involved in the program was reported to be 131, and by June 1971, the target was raised to 614,000. NAB officially claimed that the goal of 100,000 had been met as of June 30, 1969, and that it was on target for the June 30, 1970, goal of 338,000 disadvantaged men and women hired, trained, or in training.[25/] These figures included trainees in firms which received government subsidy and those in firms without government subsidy. The Department of Labor reported that persons hired through the federally-financed JOBS program in fiscal year 1969 numbered 51,000 and in fiscal year 1970 numbered 86.8 thousand trainees. Reports on trainees under the unsubsidized portion of NAB-JOBS are much less rigorous and much less reliable. Because only 52 percent of the trainees under NAB-JOBS retained their jobs in the year-and-a-half ending in January 1970, some critics claimed that the program was deficient not only in numbers trained but in job retention. The recession which coincided with the launching of NAB-JOBS at the end of the decade undoubtedly helps to explain the failure of the program to live up to its earlier expectations.

From the standpoint of this review, however, the controversy over the specific number of trainees in the NAB-JOBS program is only symptomatic of

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[25/] Myers, The Private Sector in Manpower Development, pp. 32-33.

the general problem of statistical data on on-the-job training programs for the disadvantaged. The reported data provide only minor illumination in our effort to make a quantitative assessment of the extent of training programs within business and industry.

Training of Clerical, Managerial, and Technical Manpower

Although this study is primarily concerned with skill development of blue-collar workers, it should be noted that a large proportion of white-collar workers are trained through company-sponsored programs. Clerical, managerial, and technical employees also receive more formal education and training off the job, as compared with blue-collar workers. In the 1963 government survey, reporting on the training background of workers between 22 and 64 years of age with less than three years of college, it was found that formal training had been received by 64.6 percent of professional, technical, and kindred workers, and by 53.6 percent of clerical and kindred workers, as compared with 40.6 percent for craftsmen and foremen and 12.9 percent for operatives and 6.9 percent for laborers. On-the-job training had been received by 71.4 percent of the clerical and kindred workers, by 60.2 percent of the sales workers, by 45.5 percent of the service workers, and by 56.2 percent of all other occupational groups.[26/] Whereas secretaries and stenographers are customarily trained in high school or in post-secondary courses of business schools or junior colleges, telephone operators and office machine operators are more likely to be trained in company-sponsored schools or on the job. Since almost 30 percent of the clerical and kindred workers and approximately 45 percent of those in all other occupational groups indicated that they achieved their skill from "having just picked up" the trade, the previously indicated difficulty of distinguishing between on-the-job training and simply "learning by doing" is applicable to

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26/ Formal Occupational Training of Adult Workers, p. 18; and Myers, The Private Sector in Manpower Development, pp. 51-52.

white-collar as well as blue-collar work. Contrary to the high proportion of on-the-job training for clerical workers in the national survey, Richard Perlman, in his more intensive study of training in Milwaukee firms, found that only 5 percent of office jobs were filled by workers who had taken additional company training.[27] Although the disparity in findings may be explained by the differences in the samples used, it is likely that the disparity results, in part at least, from the more rigorous distinction that Perlman was able to draw between training and the simple acquisition of skills during employment.

The complex interaction of formal schooling and on-the-job training and experience is seen in the study of workers who shifted from blue-collar to white-collar work in Milwaukee, conducted by Stern and Johnson.[28] Of the 452 respondents who had shifted from blue-collar to white-collar work, 133 were full-time students at some point after the age of 18. Schooling was especially important among those who shifted from blue-collar trades to professional and technical occupations. Part-time schooling while at work was even more important as a source of advancement to white-collar occupations. School attendance on a part-time basis during the course of their working lives was reported by 314 persons in the sample. Here, too, professional and technical employees reported a higher proportion of part-time education while at work. For professional and technical employees, it was reported that the most importance source of the skills that enabled them to make the shift from blue-collar work was formal schooling, with on-the-job experience a close second. On the other hand, managers and foremen felt that on-the-job experience was most important in acquiring the skills necessary for their shift from blue-collar work. For those who moved to clerical and sales work from blue-collar

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[27] Perlman, On-the-Job Training in Milwaukee, p. 15.

[28] James L. Stern and David B. Johnson, Blue- to White-Collar Job Mobility (Madison: Industrial Relations Research Institute, University of Wisconsin, 1968), pp. 148-166.

occupations, on-the-job experience was considered to be the most important route.

In the Stern-Johnson study, it was reported that 43.6 percent of the respondents had received on-the-job training in their first white-collar jobs after shifting from blue-collar work. This number included 19 percent of the draftsmen, 62 percent of the industrial engineering technicians, 78 percent of the electrical and electronic technicians, 43 percent of the managers, 38 percent of the foremen, and 32 percent of the production clerks. The authors note that it was not possible to total or average the time spent by respondents on these programs. While some reported 40 or more hours per week of on-the-job training for periods of as long as one year, others indicated that their training lasted for only a number of hours or for a relatively short period of time.[29/]

In a survey of company training programs for white-collar workers, Myers reports on specific studies in banks, insurance companies, telephone companies, hotels and motels, and several manufacturing firms. He also discusses cooperative programs of company-sponsored training and university of college courses for professional and technical workers and managerial personnel.[30/] Although these studies provide useful insights into the number of trainees, techniques, and results in particular companies and programs, they provide little evidence on the extent of such company training programs within occupations, industries, or the nation as a whole.

In one extensive study of skilled workers in St. Louis and Chicago in 1963-1966, Franke and Sobel found that, for engineering technician occupations, upgrading was the common route of entry, and the possibilities for building

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[29/] Ibid., pp. 164-165.

[30/] Myers, The Private Sector in Manpower Development, pp. 51-80.

on a variety of education, training, and on-the-job experience provided the flexibility required for an easing of skill shortages.[31] Although the authors recognize the importance of on-the-job training for such occupations as tool-and-die makers, they stress the greater effectiveness of training in the public junior or community college for most of the technician occupations.

3. Evaluation of Company Training and Skill Development

There have been very few efforts at a rigorous evaluation of the costs and benefits of on-the-job training as compared with other methods of skill acquisition. The paucity of studies undoubtedly stems from the absence of data on training within industry. As has been noted above, there are no conclusive statistics on the extent of on-the-job training, and even companies that maintain records of enrollees seldom have equivalent records of costs for time spent in training. Although many companies have some informal information on the effectiveness of specific types of company training, even this type of in-house study is rare, and results are seldom made public. Two students of company training programs have concluded: "Evaluation of training in industry is in much the same category Mark Twain placed the weather. There are frequent references, both oral and written, to the necessity for evaluating training, but little evidence of any serious effort in this direction."[32]

There have been a number of evaluations of government-sponsored training programs for the disadvantaged. These range from simple tabulations of the

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[31] Walter Franke and Irvin Sobel, The Shortage of Skilled and Technical Workers: An Inquiry Into Selected Occupations in Short Supply (Lexington, Massachusetts: Health-Lexington Books, 1970).

[32] William McGehee and Paul W. Thayer, Training in Business and Industry (New York: John Wiley & Sons, 1961), p. 256.

number of trainees placed on jobs and their change in earning, to rigorous cost-benefit analyses.[33/] However, these evaluations are almost entirely devoted to institutional training in vocational schools or skill centers, and since they emphasize training for the disadvantaged they cover only a small proportion of institutional training in the United States. The even greater amount of training that occurs on the job has remained almost entirely outside of the realm of formal evaluation.

In the evaluations of training programs for the disadvantaged, the only studies which included a careful analysis of the costs and benefits of on-the-job training were those of Sewel, Bateman, The Planning Research Corporation, Scott, and Gunderson.[34/] Unfortunately, these studies were so limited by

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[33/] See the summaries contained in Gerald Somers, Retraining the Unemployed (Madison: University of Wisconsin Press, 1968); Einar Hardin, "Benefit-Cost Analyses of Occupational Training Programs: A Comparison of Recent Studies," in Cost-Benefit Analysis of Manpower Policies, eds. G. G. Somers and W. D. Wood (Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1969); and S.A. Levitan and Garth L. Mangum, Antipoverty Work and Training Efforts: Goals and Reality, and Garth L. Mangum, Contributions and Costs of Manpower Development and Training (Ann Arbor: Institute of Labor and Industrial Relations, University of Michigan-Wayne State University, 1967).

[34/] W. Bateman, "An Application of Cost-Benefit Analysis to the Work Experience Program," American Economic Review, 57 (May 1967), pp. 80-90; Planning Research Corporation, Cost-Effectiveness Analysis of On-the-Job and Institutional Training Courses (Washington: 1967); L. Scott, "The Economic Effectiveness of On-the-Job Training: The Experience of the Bureau of Indian Affairs in Oklahoma," Industrial and Labor Relations Review, 21 (January 1968), pp. 210-225; David Sewel, Training the Poor (Kingston, Ontario: Industrial Relations Centre, Queen's University, 1971); and Morley Gunderson, "Determinants of Individual Success in On-the-Job Training: An Econometric Analysis" (Ph.D. thesis, University of Wisconsin-Madison, 1971).

insufficient data or by the specialized nature and size of samples that they cannot provide conclusive evidence on the comparison between on-the-job training and other forms of skill acquisition. Essentially, these studies looked at either an on-the-job training program or an institutional training program, and conditions between the two types of training programs are sufficiently diverse to preclude a worthwhile comparison utilizing this approach. In the study for the Planning Research Corporation, the author, Allan Muir, admits that the data for on-the-job training are so sketchy as to prevent a reliable comparison with institutional training results.

Even in the case of the NAB-JOBS program, where reporting was required by the administering government agency, the evaluations go little beyond an accounting of the number of workers involved and their retention rates. With regard to enrollees and retention, the picture was clearly influenced by the level of national employment and unemployment. Some initial success was associated with growing labor shortages, but by 1970 the number of workers hired under the program and their retention rates were adversely affected by growing national unemployment.[35/] Because of the continuing rates of national unemployment, funding for this program has been reduced.

Other evaluations of company training programs for the disadvantaged, the displaced, or those potentially displaced by technological change have been lacking in quantitative analysis and have been equally inconclusive.

In a survey of industry-initiated retraining programs for displaced workers, or potentially displaced workers, in the San Francisco Bay area,

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35/ See Greenleigh Associates, Inc., Summary of Major Findings, Conclusions and Recommendations on Job Opportunities in the Business Sector (JOBS) Program (September 1970); and The JOBS Program (Job Opportunities in the Business Sector) Background Information, A Report by Senator Gaylord Nelson's Subcommittee (Washington: U.S. Government Printing Office, May, 1970); and Myers, The Private Sector in Manpower Development, pp. 32-42.

Ida Hoos found only scattered, isolated programs in a few firms. She concluded:

> These research findings, substantiated by further investigation, support the thesis that, except in instances of short supply, industry develops few retraining projects. Orientation and indoctrination appear to be more common areas of focus for industry's efforts. Lack of commitment to employees with respect to revitalizing obsolescent skills is one of the realities of the marketplace. Industry invests in such measures only when it cannot draw upon some labor pool to fill its needs .... The narrow skill base thus provided has proved to be extremely vulnerable to later technological change. Among the semiskilled workers now being displaced by automation are those whose knowledge and proficiency are limited to one operation or one piece of equipment.36/

Doctor Hoos notes that one of the reasons for the paucity of retraining programs for displaced workers is that industry assumes little responsibility for such persons. Referring to the early experience with automation funds, she points out that the search indicates that many of the disemployed choose the option of a lump sum severance payment rather than a retraining program which will provide them with skills for future labor market opportunities. Thomas Kennedy, also writing about the experience at the beginning of the 1960s, supports the view that little in the way of retraining of displaced workers or potentially displaced workers was being initiated by the private sector under automation funds at that time.37/ The evaluation of the limited training experience under automation funds at that time offered little encouragement for the adoption of this path to worker readjustment in the labor market.

Later evaluations of the retraining programs established under the Automation Fund Committee of the Armour-Union agreement provide a mixed picture of the extent and benefits of retraining. After looking at the number of trainees, their completion rate, employment success, and earnings after

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36/ Ida R. Hoos, Retraining the Workforce: An Analysis of Current Experience (Berkeley: University of California Press, 1967), pp. 99-100.

37/ Thomas Kennedy, Automation Funds and Displaced Workers (Boston: Harvard University Graduate School of Business Administration, 1962), pp. 339-341.

displacement in the shutdown of Armous plants in Oklahoma City, Fort Worth, and Sioux City, Shultz and Weber reached the following conclusions:

> The concepts of "success" and "failure" are inherently ambiguous and cannot be applied to the results of the Automation Fund Committee's retraining efforts with any precision. It is sufficient to note that to date most displaced workers who have enrolled in such programs have seen them through to completion and found some remunerative employment. Where open access to the different sectors of the labor market is maintained, there is a reasonable expectation that in time the retrainees will have an opportunity to utilize their new skills and augment their earnings. In general, the retrainees appear to fare better in the market than their peers who have chosen to forego additional formal training. Whether this evaluation points to "success" is largely a normative question. But it seems safe to assert that retraining for displaced workers is one promising point of departure in what is often a long and arduous process of adjustment.38/

The most recent report on the Armour Automation Fund experience is that on the Kansas City shutdown conducted by James Stern, for the University of Wisconsin's Center for Studies in Vocational and Technical Education. The shutdown occurred in 1964-65, and workers were given the principal options of transferring to other Armour plants, terminating their employment and taking additional training, or terminating their employment and entering directly into the labor market in search of alternative jobs. Stern analyzed the pre- and post-shutdown earnings of workers who chose each of these options. The largest number of displaced workers entered directly into the market; a somewhat smaller number entered a training program; and a smaller number yet chose transfer to another Armour plant. Those who chose transfer enjoyed significantly higher earnings than did the other displaced workers. However, from the standpoint of our study, Stern's most interesting finding was the unexpected one that the earnings of workers who chose training were not significantly improved by this choice. They did not even do as well as those who choose to enter directly into the labor market without training. Many of the

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38/ George T. Shultz and Arnold R. Weber, Strategies for the Displaced Worker (New York: Harper and Row, 1966), p. 170.

workers had been trained at an experimental multi-occupational MDTA Training Center. The Center included basic education classes, prevocational training, extended counseling, and the opportunity to visit several types of vocational classes before selecting one. In spite of these efforts, training did not "pay off," and Stern speculates on the reasons for this failure. His speculation centers around the notion that workers who chose to take training rather than enter directly into the labor market may have been less aggressive, less ambitious, or less attractice in appearance than those who were able to find jobs immediately on their own.[39/]

The divergent results of the Shultz-Weber studies and the later report by Stern can possibly be explained by the difference in time periods and location of the Armous plants that were shut down, and by the differences in statistical methodology used in the two reports. By utilizing multiple regression analysis, Stern was able to derive conclusions on the net effect of training while holding other variables constant.

If the evaluation of paths selected by displaced workers is inconclusive, the evaluation of the benefits to be derived from various paths of skill acquisition must be considered largely unexplored. As has been noted above, Horowitz and Herrnstadt's study of training of tool-and-die makers in the Boston area is the only thorough study of this kind. The numbers choosing the various paths to skill status as journeymen tool-and-die makers were discussed above. From the standpoint of evaluation, the study's most provocative finding was that the various training paths differed little in their effectiveness; no single path was significantly superior to the others. Effectiveness was measured in terms of performance ratings given to the men by their super-

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[39/] James L. Stern, Consequences of Plant Closure, Center for Studies in Vocational and Technical Education, University of Wisconsin-Madison, 1971 (mimeographed report); and the article adapted from this report, "Consequences of Plant Closure," The Journal of Human Resources (Winter 1972), pp. 1-25.

visors, the length of time spent in training, the amount of time required after their formal schooling to become all-round competent craftsmen, and the time it took to be classified initially as tool-and-die makers. No path ranked first on all measures of effectiveness. However, it should be noted that vocational high school combined with apprenticeship scored best on most counts. It had a high proportion of men with better-than-average performance ratings, required the least time to produce an all-round tool maker and an all-round die maker, and took the shortest time for a man to be classified as a die maker. It also involved only moderately long training.[40/]

The authors admit that these small differences in ratings are partly explainable by the problems of measurement. Despite careful classification, the paths may not be completely mutually exclusive. For example, even though apprenticeship is designed as a training system that includes a certain amount of classroom instruction, one-half or more of the apprenticeship graduates report as having received no related instruction. For this group, the distinction between apprenticeship and simple on-the-job training is blurred. The benefits to be derived from the various training paths are also found to be influenced by the needs of employers. For example, one important finding of the study is that the all-round tool-and-die maker is needed less frequently than the man whose training and skill is more limited. Some wanted tool makers, other die makers, and the rest--a minority--tool-and-die makers.

The authors also admit that a principal lack in the study is the absence of data on the costs of the various training paths. Since there are no significant differences in the benefits of the various paths, it becomes especially important to know whether there are significant differences in the

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[40/] Learning the Tool-and-Die Maker Trade, Manpower Research Monograph No. 17, 1970, p. 8.

costs of reaching the same level of proficiency. For example, it was found that it generally takes less time to produce an all-round tool-and-die maker by systematic training than by picking up the trade or informal on-the-job learning. But, if it were also found that the latter informam methods of skill acquisition were considerably less costly, it might be concluded that the informal methods were to be preferred even if they took somewhat longer.

Another conclusion of the Horowitz-Herrnstadt study is that the characteristics of the individual worker and the opportunities available at a particular time may be more important than the type of training in determining the "best" path to occupational skill. This calls for greater knowledge of individual trainee characteristics and employment opportunities.

4. Some Unanswered Questions

The review of research on company training programs impresses one with the quality of the scattered investigations and the evaluations. However, as in many areas of social science inquiry, one is even more impressed with the gaps in knowledge which remain. It is useful to list some of the "unanswered questions" noted by Charles Myers in his recent review of the role of the private sector in manpower development. We will also add some of our own.

1. How many workers are trained under company programs, either informally on the job or through more formal classes, as compared with other alternative routes by which skill may be acquired? Definitional and other methodological problems in earlier surveys leave this question essentially unanswered. We do not even have a good current estimate of the total numbers, let alone the subclassification by occupation or industry.

2. How good is informal on-the-job training, as compared with institutional training or other formal methods of skill acquisition? Our information on this point at the present time is essentially limited to tool-and-die makers in the Boston area.

3. What is the most effective method of skill acquisition, not only in terms of the measure of benefits, but also in terms of the measures of cost? Even though the Horowitz-Herrnstadt study was limited to one occupation in one area, this study could evaluate effectiveness only in terms of benefits without reference to costs. When benefits are roughly similar for different training paths, cost differences become crucial in formulating policy for skill acquisition.

4. To what extent are present educational and training requirements in apprenticeship programs really necessary to achieve competent journeyman status? What combinations of vocational schooling, formal apprenticeship, and on-the-job training are likely to be most effective in specific plants? Horowitz and Herrnstadt give us valuable information in answer to this question for one occupation in one area. The question in broader scope remains.

5. What is the role of company-initiated training in the allocation process of the internal labor market? Piore and Doeringer have provided some useful, largely qualitative judgments on the basis of their survey. A further quantitative evaluation is required in relating mobility paths to skill acquisition paths.

6. Is the transferability of skill from one company to another affected by the particular path by which that skill was acquired? The theoretical literature on training emphasizes the distinction between specific training and general training. Little has been done as yet to determine whether specific training actually hampers inter-employer mobility in practice as it is expected to do in theory.

7. What procedures in methodology, definition, and data-gathering can be devised to further the analysis and evaluation of company-sponsored programs? The literature discussed above demonstrates the paucity of data and the confusion of results stemming from differences and deficiencies in methodology of training surveys.

This pilot case study of training and skill acquisition in the Gisholt Company cannot answer all of these questions. However, it attempts to answer some of them and make some contribution to filling the gaps in our knowledge of company training.

CHAPTER III

METHODOLOGY

This study uses the case study approach to determine the function, extent, and importance of company-sponsored training. The subject of the investigation is the Madison, Wisconsin, plant of the Gisholt Machine Company Division of Giddings and Lewis, Incorporated--a medium-sized machine tool manufacturing plant located in the Midwest.

In this chapter the methodology of the study is reported. Included in the discussion are: (1) the reasons for selecting the Gisholt Machine Company as the subject of this investigation; (2) a brief description of the company and the labor market area in which it is located; (3) a statement of the methods used to retrieve data from both the company and its work force; and (4) an analysis of the missing data and their significance for the validity of the study.

1. Reasons for Selecting the Gisholt Machine Company

The results of previous research suggest that a narrow and intensive case study of worker training within one firm would be fruitful. By substituting in-depth investigation for an expanded sample size, we are able to guarantee employer cooperation, clarify important concepts, and, at the same time, acquire hard data on worker training. Obviously, the subject of this study--the Madison plant of the Gisholt Machine Company--cannot be representative of all manufacturing firms. Nevertheless, in our opinion there are sound reasons for concentrating our research on the machine tool industry in general and on this one plant in particular.

Machine tool manufacturing firms, along with other firms in the metal working machine and equipment industry, constitute a critical sector of our economy. Although employment in all metal working machine and equipment establishments represents less than one percent of all private employment and about ten percent of all manufacturing employment, its size belies its

significance. As producers of power driven machines and component parts for durable goods, this industry leads others in periods of economic downturn and recovery. Production shortage in this industry can cause rippling effects in other sectors of the economy.

Employment within all metal working industries has been of special interest to manpower researchers. Highly skilled workers such as tool-and-die makers, machinists, setup men, layout men, and technicians play an important part in the manufacturing of machine tools and related components. Because of their significance, the training and preparation of metal working craftsmen, particularly tool-and-die makers, has been the subject of many intensive investigations during the last decade. This research could supplement the findings of these inquiries by further documenting the contribution of company training practices to the development of skilled manpower. At the same time, the large number of semiskilled and operative workers employed in the industry offers an unique opportunity to study formal as well as informal methods of job training, an area in which there are major gaps in our knowledge.

Finally, this case study of a firm in the machine tool industry will serve as a useful companion study to the extensive national study of occupational training in all metal working establishments currently being conducted by the Bureau of Labor Statistics.

2. The Gisholt Machine Company

The Gisholt Machine Company was incorporated under Wisconsin statutes in 1889. Through a series of acquisitions, it grew into a major midwestern producer of machine tools with primary plants in Madison and Janesville, Wisconsin, and subsidiary operations in Scotland and Italy. In 1966, Gisholt was itself acquired by Giddings and Lewis, Inc.--another Wisconsin-based manufacturer of machine tools--but the company name was maintained as were most of the managerial personnel and all of the hourly employees.

Gisholt's main plant and administrative headquarters were located in Madison. At this plant, which totaled 700,000 square feet of space, Gisholt's own brand of turret lathes, superfinishers, balancing machines, and other machine tools were produced within its manufacturing division. A large portion of production time was spent building components and machines to meet the special needs and specifications of customers. As one would expect, the company maintained an extensive maintenance division to repair production machines and equipment. Gisholt also offered its customers repair and maintenance service through its sales division. This division operated a training center at the plant to orient the maintenance and operating staffs of customers. Finally, the plant maintained its own small foundry, but large quantities of steel and other metals were purchased as needed.

Total employment at the Madison plant, after World War II, fluctuated with general economic activity. The lowest employment level during this period was 898 workers in 1958, a year of national recession. By 1970, employment at Gisholt's Madison plant was at an all-time high, with the company reporting more than 2,000 employees of whom about 1,100 were hourly production workers. Compared to the employment levels of other firms in the metal working machine and equipment industry and using 1963 data (the last year for which national data exist), Gisholt was one of the 14 largest firms in its industry. Interestingly, of the 801 firms classified as metal working machine and equipment manufacturers in 1963, 706 employed less than 100 persons, and only 14 firms had more than 1,000 workers.

Gisholt was also one of the largest employers in Madison, Wisconsin, and the surrounding labor market area which includes Dane, Sauk, and Columbia Counties. Of the 165 Madison area firms with more than 50 employees in 1970, only five firms (including Gisholt) had more than 1,000 employees. The overwhelming majority of firms in the Madison area employed less than 100 workers each.

In addition to being one of the largest employers in Madison, Gisholt was also one of the few manufacturers of durable products in an area dominated by white-collar employment. According to the 1960 Census, 50.9 percent of all employees in Dane County, of which Madison is the principal city, were in white-collar occupations. Nearly 21 percent of all employment in 1959 was in retail and wholesale trade establishments. Educational institutions constituted the next largest sector in that year--12.3 percent--reflecting Madison's well developed public school system, vocational and technical schools, and the University of Wisconsin and Edgewood College. A large portion of all employment in Madison is in the public sector. As the state capital of Wisconsin, Madison is the home of three levels of government--city, county, and state. Recent surveys show that these governments currently are the largest employers in the Madison area, accounting for nearly 32 percent of the work force.

As a consequence of Madison's industrial mix, the Gisholt Machine Company was dominant within the labor market. It was able to select and/or train the best industrial workers with less chance that they would be pirated away than in larger, more diversified manufacturing centers. Such dominance within the labor market must be kept in mind in appraising the results of this study.

On the other hand, the extensive occupational and skill requirements of machine tool manufacturing make the Gisholt Machine Company an appropriate subject for a case study of worker skill acquisition. For instance, over 600 different job titles existed within the company, spanning skilled, semiskilled operative, clerical and unskilled occupations. A detailed listing of key occupations within each of these general skill categories is provided in Table III-1.[1/]

[1/] Specific job titles made no mention of the general occupational grouping to which they belonged. Since analysis could not be conducted on each job title individually, jobs were classified into skill groupings on the basis of assigned labor grade.

TABLE III-1

KEY OCCUPATIONS INCLUDED IN SKILL CLASSIFICATIONS

Skilled Workers and Craftsmen	
Gear cut operator	Blacksmith
Tool-and-die maker	Heat treater--flame cut machine operator
Electrician-installation and maintenance	Core maker
Repair and maintenance welder	Machinist
Steam fitter and plumber	Service repairman
Set-up men	Sheetmetal worker
Semiskilled Operatives	
Lathe operator	Assembly bench worker
Drill operator--upright, radial and horizontal	Machine erection worker
	Electrical panel assembly worker
Milling machine operator--horizontal and vertical	Fireman
	Punch press operator
Threading machine operator	Welder--foundry
Planner--horizontal and vertical	Cupola tender
Clerical Workers	
Time and booth dispatchers	
Office machine operator	
Stock or tool bin tender	
Unskilled Workers	
Polisher	Pacher
Hand trucker	Parking lot attendant
Foundry laborer	Guard
Crater	Janitor

In January 1971, five months after we had begun our research and preliminary planning for data retrieval, Giddings and Lewis announced that it was closing the Gisholt Machine Company. The announcement came as a great surprise to Gisholt's employees, the Madison community, and the research investigators. Although there was a labor dispute in 1968 and a rather large layoff due to an economic slowdown in the fall of 1970, the research staff saw little reason to question the continued existence of the company when the study was initiated. The decision to close Gisholt, however, was made by Giddings and Lewis at the corporate level and was motivated by a severe recession in the machine tool industry. According to parent company officials, Gisholt's continued existence could no longer be justified on a profit and loss basis.

The decision to close the plant did little violence to our original research objective--i.e., to study training within the firm. Our study, as described below, includes workers employed at Gisholt during 1970. The plant's unexpected closing afforded some limited opportunity to assess the transferability of training and work skills to other employers in the Madison labor market area.

As might be expected, however, there was resentment among the workers as a result of the shutdown. These sentiments proved to be an obstacle to the collection of valid data and required persistent retrieval techniques to ensure an adequate response. The techniques employed and their results are described in the remaining sections of this chapter.

3. How the Data Were Gathered

In order to accomplish the objectives of this project, data were gathered from four groups, each representing an important source of information on the company's training operations: (1) company managerial personnel; (2) all hourly production workers; (3) foremen and supervisors; and (4) related community agencies and institutions. The responses of each group were analyzed,

using an appropriate research technique for the number and type of responses for the particular group.

General Information and Managerial Personnel

Prior to interviews with company managers on the company's training policies and activities, the researchers familiarized themselves with company operations through discussions with members of Gisholt's industrial relations and personnel staffs. These discussions also contributed to the development of working definitions of training within the firm. As a result of these discussions, the following important aspects of company training practices were identified:

1. The scope of training--number of programs, number of trainees, and duration of training.
2. The status of company records on training.
3. The extent to which training costs were calculated and the actual training costs data which could be made available to research investigators.
4. The relationship between the scope (i.e., the size and nature) of company training activities and conditions in the product and labor markets.
5. The relationship of company training to the operation of the internal labor market--hiring, promotion, and mobility of labor.
6. The impact of union-management relations on company training.

The staff of the personnel department then recommended an appropriate company official or officlas who could provide insights into each of these aspects. Their list of recommended officials include representatives from each of the company's main divisions--manufacturing, sales, service, and plan maintenance--as well as departmental managers in industrial engineering and industrial relations. Through the efforts of the personnel department, we were able to conduct a series of structured interviews with these top level managers.

It is important to note that in spite of the diverse backgrounds, knowledge, and responsibilities of the interviewed managers, the most informed and reliable source appeared to be the company's personnel manager. As the

company's representative with primary responsibility for training, it was logical that he was most aware of the specific details on company training policies and practices. His usefulness to this research was enhanced by his long-standing interest in training and his willing cooperation.

Hourly Production Employees

One of our research objectives was to document fully the nature of skill acquisition of hourly workers for the period prior to, during, and after their employment with Gisholt. The population of hourly workers was defined, therefore, to include all hourly employees on the payroll during calendar year 1970. This number included many workers who were no longer with the company at the start of our surveys in February 1971. Naturally, the number who were classified as Gisholt's "former employees" increased greatly as the study progressed and production layoffs began. In all, Gisholt had 1,104 hourly employees during 1970.

Given the size of this population and the complexity of worker skill acquisition, it was felt that the study of hourly workers was best achieved through a series of mail questionnaires, supplemented by more intensive personal interviews. While it was recognized that there is a large potential for reporting error in the mail questionnaire approach to training data, it was felt that a combination of mail questionnaires and personal interviews offered some opportunity to estimate the magnitude of this error and its implications for further surveys of worker training within industry.

The hourly worker population was divided into two groups, one to receive mail questionnaires and the other to be interviewed personally. The personal interview group was designated by randomly selecting 200 persons from the population of all hourly employees, leaving 904 observations in the mail questionnaire group.

After extensive revisions, a mail questionnaire was developed which requested data on the following general subjects:

1. Demographic and personal characteristics.

2. Formal education and vocational school experience.

3. Pre-Gisholt employment histories, including company-sponsored training activities.

4. Detailed employment and training experiences while working for Gisholt.

5. Post-Gisholt employment and training experience.

Once pre-tested, the mail questionnaire served as the basis for the personal interview schedule. All informational requrests in the mail questionnaire also appeared in the personal interview, but the latter instrument sought this information in greater detail. The personal interview, moreover, placed a heavier emphasis upon attitudinal variables.

Beginning in early February 1971, mail questionnaires were sent to 890 hourly employees (14 respondents were used for pre-testing previous drafts of the questionnaire), using the respondent's last known address. To ensure the success of the mail questionnaire approach, a second mailing was sent to nonrespondents, and, where necessary, the second mailing was followed by a telephoned reminder. At the same time, interviewers of the University of Wisconsin's Survey Research Laboratory began contacting the persons in the interview sample.[2/]

Response rates for both survey methods are presented in Table III-2. Not surprisingly, the final completion rate for the mail questionnaire (54.6 percent), even after three contact rounds, is less than the rate achieved

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[2/] It is important to note the orientation and special instructions given the interviewers in preparation for their work. Ordinarily, special briefing sessions are required to familiarize interviewers with the research schedule and potential trouble spots in the research design. Such difficulties were compounded, given the highly technical nature and unique jargon of jobs within the metal working machine and equipment industry. Special efforts, therefore, were made to give each interviewer a general familiarity with this industry.

TABLE III-2

RESPONSE RATES BY METHOD OF DATA RETRIEVAL FOR HOURLY EMPLOYEES

(1) Method of Data Retrieval	(2) No. of Contacts	(3) Type of Returns	(4) No. of Returns	(5) Responses as Percentage of Column (2)
1. Mail questionnaire				
a. 1st round mailing	890			
		Completed	331	37.0%
		Reported deaths	2	.2
		Nonforwardable (address unknown)	26	2.9
		TOTAL returned	359	40.1
b. 2nd round mailing	531			
		Completed	114	21.4
		Nonforwardable	5	.9
		TOTAL returned	119	22.3
c. 3rd round (telephone)	412			
		Completed	41	9.9
d. Total from all 3 rounds		Completed	486	54.6
2. Personal interview	200			
		Reported deaths	1	.5
		Completed	173	86.5
		Not traceable (probable moves outside of survey boundary)	12	6.0
		Refusals	14	7.0
3. TOTAL (mail questionnaire plus personal interview)	1090			
		Completed	659	60.4
		Reported deaths	3	.3
		Refusals and not traceables	428	39.3

by personal interviews (85.6 percent). For the group receiving mail questionnaires, cooperation was found to diminish with each follow-up contact, and while further follow-up would probably have netted more information, there was little indication that the marginal information gained would have been worth the added costs. The closing of the plant just prior to the survey contributed to a reduction in the response rate. In total, information was fathered from 60.4 percent of all hourly workers.

Foreman and Supervisory Personnel

The importance of supervisory personnel in the training of workers, particularly semiskilled workers, is often overlooked. Usually foreman or supervisors are given the responsibility for assigning new workers to specific jobs, for designating an experienced worker to serve as instructor or trainer, and for monitoring the progress of new hires. In many cases, it is the supervisor who serves as the primary instructor for new workers by taking time away from his other daily responsibilities. Where companies maintain upgrading programs for their employees, it is common practice for the supervisor to identify deficiencies in workers under his supervision. Since many supervisors are promoted from within the company, their knowledge of company training activities is often extensive.

For these reasons, a random sample of 30 supervisors was selected from among the 78 persons employed in such jobs during 1970. In all, 20 interviews were completed, mostly with persons who were still employed at Gisholt or who were still living in the Madison area.

The interviews with foremen and supervisors utilized the same survey instrument as had been used in interviews with hourly production workers. In addition, a specially developed instrument was used to gather detailed information on training duties and responsibilities of supervisors. Special attention was given to the role of supervisors during on-the-job instruction.

4. The Significance of Missing Data

Missing information is a source of potential study bias often overlooked in studies employing survey research techniques. In this study, the nonrespondent is particularly important for two reasons. First, as indicated earlier, one of the research objectives is to determine the relative merits of using either mail questionnaires or personal interviews to study the training of workers in industry. It is important, therefore, that the samples produced from each technique be comparable for analysis. Second, Gisholt's announcement that it was closing its plant preceded the field work and produced a great deal of unfavorable public reaction. It was believed that resentment over the company's decision could influence both the quantity of data received and the quality of the responses. The first of these issues will be discussed in Chapter IX, while the latter point bears on the validity of the entire study and is appropriately discussed below.

Response Selectivity

Although overall response to the informational requests through mail and interview approaches appeared adequate,[3/] differing and selective response rates to the two approaches could undermine the reliability of the study. The selection of persons for personal interviews using random sampling does not guarantee that nonrespondents will also follow a random pattern. At this point, we test for such response selectivity by comparing the distribution of key variables within the completed mail-questionnaire and personal-interview samples. More rigorous tests to determine group comparability with respect to important dependent variables are conducted where appropriate in the analytical portion of this report.

[2/] The data in company records were not adequate for a full appraisal of the possibilities of bias because of non-response. An examination of responses to the first round of mail questionnaires as compared with the second round, indicates that non-respondents may have been somewhat older and with longer periods of service than the respondents.

On the basis of demographic characteristics, the two samples are almost identical. The overwhelming proportion of both samples is male and of white racial identity. Nonwhites and females represent less than 1 percent of each sample. The average age for both mail-questionnaire and personal-interview respondents is approximately 40, and the mean educational attainment is 11.4 years in both cases.

A further comparison of mail questionnaire and personal interview respondents, based upon the training experience and employment history is presented in Table III-3. As seen in this table, there appears to be very little substantive difference between the two samples, although statistically significant differences between sample statistics are observed for a few of the comparisons. The incidence of post-high school vocational training, apprenticeship, government retraining programs, correspondence school courses, and armed forces training courses in the vocational instruction of both samples are comparable. However, statistically significant differences (at the .05 level) can be found when comparing the proportion of each sample claiming high school vocational or technical training, employment experience in manufacturing firms prior to employment at Gisholt, and post-Gisholt employment. Although these results do meet the mathematical requirements for statistical significance, in no case is the absolute difference between samples larger than 10 percent.

As a consequence, reasonable inferences about the relationship of variables drawn from analysis of the personal-interview sample can be imputed to the mail-questionnaire returns. The two samples can also be combined for analysis of variables which are common to both without significant bias in the results.

Employee Attitudes Towards Gisholt: The Question of Data Quality

In spite of initial qualms by the research staff, it is reasonable to infer that resentment over Gisholt's closing had only a minor impact on overall response to our surveys and that persons who did respond to interview and mail

TABLE III-3

COMPARISON OF MAIL QUESTIONNAIRE AND PERSONAL INTERVIEW SAMPLES ON SELECT VARIABLES

Variable	(1) Proportion of Mail Questionnaire Sample[a]	(2) Proportion of Personal Interview Sample[b]	(3) Difference Between (1) and (2)
Training and related experience prior to employment at Gisholt			
a. Vocational, technical, or industrial arts education while in high school	24.0%	31.8%	7.8%*
b. Post-high school vocational or technical training in a vocational school or junior college (not including apprenticeship training)	13.6	19.1	5.5
c. Apprenticeship	4.1	4.1	0
d. Government retraining program	2.9	4.0	1.1
e. Correspondence school	4.1	6.4	2.3
f. Training courses given while in the Armed Forces (other than basic education)	20.4	24.3	3.9
g. Experience in manufacturing industries	47.3	54.3	7.0*
h. Experience in the durable products manufacturing industries	9.1	6.4	2.7
i. Experience in the occupational duties assigned on the first job with Gisholt	14.2	13.8	.4
Skill level of first Gisholt job			
a. Skilled	38.2	36.9	1.3
b. Semiskilled operative	39.1	41.0	1.9
c. Clerical	6.9	6.9	0
d. Unskilled laborer	15.8	15.0	.8
Employment experience since leaving Gisholt's employ	23.6	33.5	9.9*

[a] n = 486. [b] n = 659. [c] Occupations are broadly defined at the three-digit Census Occupational Code level.

*Significant at the .05 level.

questionnaires were comparable on key variables in the analysis. But neither of these findings ensures the quality of the data which were provided. Unfortunately, there is no simple way of validating responses, even if relevant data were available from company records. We are forced, therefore, to accept responses as given and infer any possible errors from conflicting responses provided by the employees.

A number of irregularities, such as inconsistencies in answers, partially completed questions, and marginal comments, were discovered in both the completed mail and personal interview instruments during the coding phase of this project. To a large extent, these were the result of either unclear directions, poorly worded questions, or insufficiently trained interviewers. Mechanical problems aside, the remaining errors in the data file might be traced to the attitudes of respondents who used the survey instruments as an opportunity to "get back" at the company.

Rather than accept the data with these errors, members of the research staff took appropriate actions to obtain the missing pieces of information. In the case of employees interviewed personally, the interviewer was asked to clarify answers and, if necessary, to re-interview respondents. In the case of mail-questionnaire respondents, staff members contacted by telephone those whose answers were incomplete in order to fill in the missing information or to arrange for completion of another questionnaire.

While no formal records of the responses to this procedure were kept, our general impressions of the results were encouraging. Except for a few hostile individuals, who had to be treated as nonrespondents in the study, workers generally complied with requests for clarification of their answers. Once having expressed their dissatisfaction with the company--that is, "getting it off their chest"--and being assured that the study was not sponsored by the

Gisholt Company, they were willing to cooperate. In fact, many of them saw a need for such a study to document the stock of skills existing at the plant to entice other firms into the Madison labor market, but in no instance were workers promised future employment if they would cooperate with our research.

One final piece of evidence seems to confirm the view that worker resentment was not as great a factor in this research as was originally feared. Presented in Table III-4 is a summary of a limited number of attitudinal questions which were included in the personal interview questionnaire and which pertained to employment at Gisholt. Although these questions were primarily concerned with worker training and preparation, the Likert response pattern, as indicated by Table III-4, shows very little worker dissatisfaction with experience at Gisholt. In each case, the mean response is 4 or greater on the Likert scale, corresponding to a general feeling of satisfaction with the manner in which the company prepared them for specific jobs and maintained opportunities for promotion and training.

A definitive test to determine the impact of worker attitudes on the quantity and quality of response requires gathering of data from non-respondents. In the absence of resources to carry out such a test, the tabulations presented here must serve as a basis for the judgment that the data in both samples are reasonably accurate and comparable.

TABLE III-4

LEVEL OF SATISFACTION WITH TRAINING AND EMPLOYMENT EXPERIENCE AT GISHOLT OF PERSONAL INTERVIEW SAMPLE

Training and Employment Experience (Actual Questions Asked)	Level of Satisfcation						
	Total[a]	Very Satisfied	Satisfied	Neither	Dissatisfied	Very Dissatisfied	Mean[b]
1. How satisfied were you with the way you were prepared for your first Gisholt job?	100.0%	28.9	54.8	6.4	6.4	3.5	4.0
2. How satisfied were you with the way you were prepared for your highest paying Gisholt job?	100.0%	33.3	52.0	4.9	5.8	4.0	4.0
3. How satisfied were you with the way you were prepared for your last Gisholt job?	100.0%	31.4	53.5	6.4	4.7	4.0	4.0
4. In general how satisfied were you with the opportunity for training at Gisholt?	100.0%	30.1	49.7	8.1	8.1	4.0	3.9
5. How satisfied were you with the opportunity for promotion when you worked at Gisholt?	100.0%	19.6	50.3	11.5	12.3	6.3	3.6

[a] N = 173. Totals may not equal 100 due to rounding.

[b] Means calculated by weighting responses as follows: very satisfied = 5; satisfied = 4; neither satisfied or dissatisfied = 3; dissatisfied = 2; and very dissatisfied = 1.

CHAPTER IV

COMPANY-SPONSORED WORKER TRAINING: AN OVERVIEW

A major finding of this research, one which became quite evident in the early stages, is that training practices at Gisholt constituted an enormously complex area of study. Even within a single manufacturing firm, a wide range of occupational skills and worker preparation techniques were represented. It became obvious that efforts to restrict the focus of any study on such questions as who were trained, why they were trained, and how, would be fruitless. Strong and significant relationships were identified between company training practices on one hand, and personnel functions, product manufacturing, and product sales on the other.

In recognition of the complexity of this subject, an overview of training practices and policies at Gisholt can be summarized under the following major headings:

1. A brief history of company training practices.
2. The definition of formal training.
3. The type and purpose of training.
4. The coordination and evaluation of training.
5. Internal training and the external labor market.
6. The influence of collective bargaining on training.

The discussion of these issues relies heavily upon the information obtained during personal interviews with company officials and other relevant parties. More rigorous examination of company training activities, including attempts to test empirically some of the hypotheses raised in this overview, are presented in subsequent chapters.

1. The History of Training at Gisholt

From all available evidence, company training activities at Gisholt noticeably changed during the decade of the 1960s. Prior to that time, training was, in the words of one company official, "a hit and miss process." At the time of this study, however, the company exhibited great pride in the extent of its formal training efforts and spoke of the need for even more extensive training programs. The history of this transition and the factors which caused it cast some light on the role of training in company operations, at least within the machine tool industry.

As a general rule, Gisholt was able to meet most of its manpower needs in the postwar period by relying upon the supply of labor in the external labor market. The company took new entrants into the firm (at all skill levels) and permitted each worker to learn his assigned job at his own pace.

According to company managers, the surrounding labor market offered an adequate supply of labor across a wide spectrum of the company's occupational needs, with a few noteworthy exceptions. One traditional source of workers was the surrounding rural communities and nearby family farms. This source rarely produced highly skilled machine tool craftsmen, but, as indicated by interviewed officials, former farm laborers or family farm workers often had the high level of mechanical aptitude needed for satisfactory job performance at Gisholt.

In addition, it was not uncommon during this period for Gisholt to hire persons with prior employment experience in the machine tool industry. Although only limited opportunities for acquiring this experience existed within the Madison area, many new workers had worked at similar jobs in Milwaukee (only 75 miles away) or at related jobs while in the armed forces. Indeed, it is a characteristic of the machine tool building industry that production technologies are highly similar from company to company. There are a modest number of basic machine tools which are often identified by brand names.

But the overwhelming proportion of workers joining the firm during this period did not have a great deal of relevant prior experience. Most were selected on the basis of their mechanical aptitude and their potential for learning machine tool operations. Worker preparation tended to be informal in nature and generally took place on the job. Responsibility for instruction was given to the immediate supervisor who, in turn, selected an appropriate instructor from among his experienced workmen. Few attempts were made to coordinate, evaluate, and improve instruction within the firm. In sum, as long as workers with adequate skills, experience, and ability were available in adequate numbers, the company saw no need for an extensive training operation.

The company's approach to the training and preparation of an adequate work force changed during the decade of the 1960s. Managers, recalling this transition, often referred to the appointment of a new training director in 1960 as the start of this new policy. For the first time in the postwar period, the company appointed a training director with specific assurances that neither his job nor training programs would be cut back during poor economic periods. With the backing of Gisholt's top management, the new training director instituted a number of new occupational programs and attempted to improve the caliber of existing instruction.

In retrospect, company officials pointed to four factors which were associated with this shift in policy. First, the company was becoming increasingly concerned with rising production costs stemming from high spoilage rates and low labor productivity. While production costs were rising for many reasons, it was hoped that more extensive worker training programs would have some effect at least upon spoilage rates.

Second, for a variety of reasons, newly appointed company managers in 1964 abandoned the incentive pay system and substituted a straight rate pay structure. The new pay system was based upon the concept of "a fair day's pay for a fair

day's work." While the new pay system was more equitable, it placed a heavy burden upon the company to improve individual worker performance.

Third, because of changing labor market conditions, the company was unable to attract and hire an adequate number of qualified employees during the period of company expansion in the middle and late 1960s.[1] As a consequence, the company hired many marginally qualified workers who required more extensive training and supervision.

Finally, the company's new concern for training could be traced to the long-term impact of new technological innovations in the machine tool building industry. For some time prior to the last decade, basic machine tool technology was being wedded to computers, thereby creating a more efficient means of manufacturing. The new type of machine tool, called a numerically controlled or computer assisted unit (NC), was become increasingly more sophisticated and was gradually replacing non-numerically controlled machines. From the company's perspective, NC technology represented a new product market, one which they had to enter in order to remain competitive. At the same time, the economics of the industry required that NC units be introduced into plant production operations as well.

The introduction of an NC product line required workers with new skills, particularly in machine manufacturing and assembly.[2] Technicians and craftsmen were required in greater numbers, as basic machines became more complex in design. Once manufactured, these machines required a knowledgeable sales force--i.e., men who could explain the benefits of Gisholt machines relative to the

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[1]Labor market unemployment rates for this period reflect the tightness of Madison's employment situation. Average unemployment rates by year during this period were: 1962-2.6; 1963-2.8; 1964-2.5; 1965-2.3; 1967-2.1; 1968-2.1; and 1969-2.1.

[2]A comparison of job skill requirements between NC and conventional machines in laymen's terms can be found in U.S. Department of Health, Education and Welfare, Office of Education, Numerical Control of Machine Tools, Point to Point System: A Suggested Guide for Training Course (Washington: U.S. Government Princting Office, 1970), pp. 11-14.

machines of competitors. Special repairmen, in addition, had to be trained by the company to service the product, just as training activities had to be initiated on occasion to train the in-house maintenance staffs of firms using Gisholt products.

On the production floor, the introduction of machine tools tended to reduce the skill requirements needed for machine operation, and, to that extent, NC units helped improve the company's relative worker productivity position. Whereas machine operators on non-NC units were required to read blueprints, delineate machining steps, select the proper tool and machine speed, and control machine operations within desired tolerances, NC units removed a large amount of this individual discretion for the worker. Semiskilled operatives now received specific step-by-step instructions in the form of a computer program. Typically, only the proper tool had to be identified and mounted. The machine would do the rest. Some newer NC machines now in operation are almost fully automated and do not even require this task any longer.

But NC technology, while reducing operative skill requirements, at the same time created a need for new employees such as machine programmers. It was often necessary for the company to train its existing employees for these occupations, since by and large few such workers were available in the external labor market or as graduates of area vocational schools.

At the time of this study, Gisholt had developed an acute awareness of the need for training activities in response to factors in the labor-product market. This awareness was often translated into specific training policies and programs which are discussed in detail below. In preface to this discussion, it is first necessary to define what is meant by a formal company-sponsored training program.

2. Defining Training at Gisholt

For many company officials not directly involved in training, training was something the company provided for every worker it hired regardless of his experience and job assignment. Further probing revealed that these officials were usually confusing informal company practices--often designed to familiarize workers with safety procedures and job layout--with actual occupational training and skill acquisition. Of course, persons more intimately concerned with worker training rarely confused orientation with actual training; but even in our discussions with such direct participants, there were occasional disagreements over important definitions and concepts.

During the early stages of the research, a working definition of training was offered as a starting point for discussion. A definition of training which had been used with some success in previous research was selected.[3] Broadly defined, training was viewed as:

> an identifiable process of occupational skill acquisition provided by Gisholt for their workers by arranging for them to learn on the job, in a classroom or other formal setting. Such activities could take place before, during, or after working hours; on a voluntary or involuntary basis; and includes programs conducted by professional and technical associations, educational institutions, training or technical institutions, and labor organizations either separately or in conjunction with management.

As an added requirement, it was necessary for the company to recognize that the activity in question represented a specific operating expense. These costs could include, for example, the cost of instructional materials, payment to instructors, lost productivity during training, or supervisory costs.

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[3]The above definition was found to be reasonably complete in general discussions of company training when using personal interviews with company officials. See G. G. Somers with the assistance of M. Roomkin, The Availability of Data on Company Training Programs: A Feasibility Study (Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1971).

While the above definition, with its heavy emphasis upon economic costs, was useful in identifying such training programs as classroom instruction, management seminars, and tuition remission programs, further clarifications were needed in order to study the extent of formal training given each worker on the job. By all accounts, training on the job, under the tutelage of instructors and experienced workmen, was the most prevalent form of skill instruction used by the company. However, from the company's viewpoint, it was almost impossible to distinguish the number of workers involved in such training from among all new placements. Company training and personnel records, except for a few instances which will be discussed later, rarely recorded the exact extent of on-the-job preparation during the probationary period of employment. In the absence of these data, many high level managers and even lower level department heads tended to see every new worker as the recipient of some training.

Evidence suggests that the lack of clarity in the definition of company-sponsored on-the-job training is a substantial obstacle to further surveys of training in business and industry. (In a subsequent chapter, these implications will be explored and specific recommendations for meeting this definitional problem will be offered). However, we saw no reason for abandoning a conventional definition of formal on-the-job training simply because company records were incomplete. Aided by information gathered directly from employees, it was possible to distinguish between workers actually acquiring new skills on the job from workers who were capable of performing their new jobs without special instructional efforts.

Somewhat less difficulty was encountered in defining entry and upgrading training. Company officials readily distinguished between these two purposes for training. Entry-level training was intended to serve as the initial preparation for new workers or inexperienced entrants into an occupation;

upgrading training, on the other hand, was intended for persons already working at the occupation, and such training sought to perfect and improve occupational skills.

Another concept requiring some clarification was the distinction between skill acquisition due to training and quality improvements resulting from practice or actual job performance. Formal training activities were defined as those identifiable actions (as previously enumerated) which brought unqualified workers to a required minimal level of productivity needed to perform the overwhelming proportion of tasks associated with a particular job. This process, as argued, entailed specific costs to the company. Employees of Gisholt not requiring this formal training already functioned at this minimal productivity level. In the absence of formal training, or once it had ended, further quality improvements in labor productivity were possible, usually as a result of practice and repetition. These additional improvements, however, were not associated with specific training costs. A few company representatives argued that these additional quality improvements in worker productivity were the result of company training. In their opinion, the daily interaction between new hires, fellow workers, and supervisors, fostered by company processes, served as an on-going instructional process; minor modifications in techniques and new technical knowledge were constantly being exchanged among workers, it was argued. Indeed, information is exchanged at the work site, but only under the most liberal definition of training could this haphazard and unplanned sharing of information be considered formal training.

3. The Types and Purposes of Training

Based upon these definitions and concepts, it was possible to identify the following types of training conducted by Gisholt:

1. On-the-job training.
2. Classroom instruction.

3. Apprenticeship programs.
4. Short courses.
5. Special upgrading programs.
6. Sales and service training.
7. Anticipatory training.
8. Management seminars.
9. Supervisory training.
10. Tuition remission programs.

Not all of these programs, of course, were conducted at the same time. Many had not been conducted for a few years, since the company was in a period of economic contraction. For discussion purposes, it is useful to distinguish between programs utilized for hourly worker preparation as opposed to those programs adopted for salaried workers. Items 1 through 7 in the above list were of the former type; the remaining items were of the latter.

Training Programs for Hourly Workers

On-the-Job Training--Instruction on the job was the most frequently used method of worker entry-level preparation. New employees or newly promoted workers were assigned to supervisory personnel who, in turn, selected an experienced worker to serve as an instructor. The on-the-job method was favored because it was the cheapest means of preparing new workers, relative to more structured training methods, because the company's training effort could be initiated or terminated with great speed and because on-the-job training could be readily supplemented by additional training programs as needed.

Workers participating in on-the-job training entered the occupation at starting rates which were below the established rate for the job. New and unprepared placements at skilled jobs were initially employed at four pay grades below the standard rate, except where they had apprenticeship status. Semi-skilled or unskilled workers participating in on-the-job training were initially

posted at two pay grades below the standard rate. Promotion to the next higher pay grade took place after 520 hours of employment. During this period the worker received the necessary amount of instruction and practice time, but his status was probationary, pending an evaluation by his instructor and his immediate supervisor.

Not all hourly workers began work below the standard rate for the job, nor did all employees receive on-the-job training. As specified in the union-management agreement, the existence of starting rates "[did] not preclude the company from hiring a new employee at a rate higher than the starting rate for a job at the standard hourly rate for the job as the case may be." The determination of individual wage rates was based upon the prior experience and training of the worker. "Factor 2" of the company's job classification system specified the required amount of employment training and experience on a particular job and related jobs. A worker who could document this experience generally started at the intermediate or standard pay rate and received little if any formal on-the-job training.

It is possible to measure the incidence of on-the-job training--that is, the proportion of workers beginning employment below the standard rate for the job--using data from personal interviews and mail questionnaires. The simple incidence of training is to be viewed as only a crude measure, since no attempt is made in this section to control for the impact of other factors such as time and group composition. As a proportion, about 75 percent of hourly employees claimed participation in some form of on-the-job instruction during the initial period of employment with the firm. The incidence of on-the-job training for the initial Gisholt job was relatively constant across large occupational categories: 76 percent for craftsmen, 66 percent for operatives, and 66 percent for clerical workers. However, a noticeable and statistically significant smaller proportion of unskilled workers (44 percent) claimed to have received on-the-job instruction.

On-the-job training was also the most frequently used method of preparing existing employees for new jobs with the company. This practice is reflected, for example, in the number of workers claiming on-the-job training as a method of preparation for their highest-rated (i.e., highest-paying) job with the company. The incidence of on-the-job training for upgrading by broad occupational categories was as follows: craftsmen--66 percent; operatives--53 percent; clerical workers--50 percent; laborers--30 percent; and all workers--65 percent. In each case, the proportion of workers receiving formal on-the-job instruction to obtain their highest-rated position with the company was less than the proportion of workers claiming similar instruction at comparable jobs at the time of their initial employment with the firm. This comparison, of course, should be qualified, since the simple incidence of on-the-job training is a crude measure, saying nothing about the duration of training. Moreover, job requirements often vary over time. But the comparison does reflect an important finding of this study: formal on-the-job training was concentrated at the time of worker entry into the firm; subsequent formal training programs were less frequent and were usually designed for upgrading of worker skills within occupations. Promotion to higher level positions was often associated with informal learning processes, at least within this one plant, as workers usually drew upon already acquired knowledge and skills from similar, prior jobs.

Classroom Instruction--Classroom training was rarely used as a method of worker preparation for hourly employees involved in production work. The costs of such instruction, both in terms of instructor salary and forgone trainee production, made this method prohibitively costly. Nevertheless, on occasion classroom training was required, particularly at the higher occupational levels. Judging from the self-reports of hourly employees, between 7 and 8 percent of them received classroom instruction when they first entered the firm as skilled craftsmen or operatives. None of the workers entering as clerical or unskilled workers reported participation in this method of training.

Classroom instruction was rarely if ever used as the sole method of worker entry preparation. It was usually employed to provide basic knowledge needed for job performance-information which could not be readily taught on the job. Such subjects as blueprint reading and principles of mathematics were examples of curricula suitable for classroom training. Skills learned while in the classroom were usually reinforced and supplemented by on-the-job training.

One classroom training program for hourly employees is worthy of special note since it was instituted under an MDTA contract. With the cooperation of the National Machine Tool Builders Association and the Wisconsin State Employment Service, the company undertook one of its more comprehensive and better training programs in recent years. Ordinarily, the company would not utilize the classroom training technique in an entry preparatory program, but tight labor market conditions had adversely affected the quality of available workers. According to company managers, the need for special training efforts was recognized. However, the company's willingness to create a highly structured program with specially designed curricula was to a great extent a function of available government subsidies. Company managers were quick to point out that without government subsidization their private effort would have been less comprehensive and would have been limited to workers with very serious skill deficiencies.

Apprenticeship--A formal apprenticeship program with indenture had been part of the company's training effort since the early 1940s. Apprenticeship programs existed at one time or another in the following trades: machinist--bench and repair; pattern maker; tool-and-die maker; blacksmith; core maker; mold maker; sheet metal worker; and steam fitter. At the time of this study, however, programs existed only in the machinist and tool making trades, with the pattern making program having been phased out recently. The absence of programs in the other trades, excluding pattern making, is understandable in light of the relatively small number of these craftsmen needed for production. A sufficient number of

such workers were available from other sources, both external and internal to the firm. In some cases, as in the blacksmith trade, changing plant technology reduced the company's need for craftsmen in particular occupations.

Apprenticeship indentures at Gisholt, at least on paper, displayed a conventional structure.[4] Each apprenticeship program was described in terms of the amount of working time or training associated with selected aspects of the job. The overwhelming proportion of the indentures took between four and five years to complete. Some workers were able to finish the program in less time if they received advanced standing due to prior experience. These reductions in program length were typically modest, since few operatives, for example, had experience on more than one or two basic machines, accounting for perhaps a two- to three-month reduction in the apprenticeship indenture. As part of the indenture, approximately 400 hours of related classroom instruction were required which would take place on company time. In addition to this related instruction, the need for additional instruction was recognized by both the employer and the apprentice in the contract. The number of hours of such additional education, its location, and the method of financing it were not specified, giving the employer great leeway in altering requirements to meet immediate or short-run manpower needs.

A unique aspect of the apprenticeship program at Gisholt was its opportunity for specialization within a craft or trade. The latter portion of the indenture could be used as a period of concentrated exposure to a specific aspect of the trade or to a particular machine. From the description of the program per se, one would infer that the company was seeking craftsmen with highly specialized, company-specific skills. In reality, however, since apprenticeship specialization

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[4] A sample description of the apprenticeship program for machinists is presented in Appendix E.

was controlled by the company, the time allowed for specialization was used frequently to meet company short-run manpower needs at specific jobs. Apprentices could be used to fill in at vacant positions, thus giving the company a small pool of available operatives and some day-to-day flexibility in allocating manpower.

During the early years of the formal apprenticeship program, the company maintained total control over apprenticeship recruitment, selection, instruction, and certification. In 1955, the union successfully requested that apprentices be included within the bargaining unit. At that time, a Joint Apprenticeship Committee (JAC) was established to administer and coordinate the apprenticeship program. New clauses were negotiated into the union-management agreement with respect to the number of apprentices permitted at any single time and the pay rates apprentices were to receive.

Under the administrative structure of the Joint Apprenticeship Committee -- that is, three management representatives and two union representatives -- few major operating difficulties were encountered. Relations between committee members did not impede the committee's efficiency. But it should be noted that the JAC within this industrial setting had very little day-to-day responsibility over apprenticeship administration.

Two problems encountered with the apprenticeship program are worthy of comment, however. First, in recent years, the JAC was unable to attract applicants to the pattern making apprenticeship program. Company managers associated their inability to attract applicants with the unattractive working conditions in the foundry and the changing tastes of local boys in favor of more glamorous occupations.[5] Second, given the sensitivity of plant employment to general

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[5]No attempt was made to raise the wages of apprentices to increase applications. Instead, the company tried more extensive recruitment campaigns in local high schools.

economic conditions, apprenticeship training was often interrupted and sometimes terminated by plant layoffs. Recognizing the seriousness of this problem, the union and the company agreed to a special apprentice seniority clause, assigning apprentices seniority within the apprentice group and thereby protecting this group from the adverse effects of plant layoffs.

The company paid the overwhelming proportion of costs of the apprentice programs. Formal programs were maintained at great expense for three reasons: First, it was one way the company could guarantee that future skilled manpower needs would be met. In this respect, the apprenticeship program was one of the few efforts by the company to train for future rather than immediate manpower needs. Second, and equally important to the company, was the feeling that apprenticeship resulted in craftsmen who were well versed in the specific aspects of the trades that were represented within the plant. Thus, a craftsman internally trained through the apprenticeship program was a more desirable employee from the company's viewpoint than a journeyman hired directly from the external labor market. The latter worker usually required some additional training or an extensive period of orientation.

To place the apprenticeship program at Gisholt in its proper perspective, it is necessary to note at this point that few persons in the study of hourly employees (about 1 percent) reported entering the company as apprentices, and 90 percent of all workers starting with the company as craftsmen indicated no prior participation in an apprenticeship program. Indications are, therefore, that apprenticeship within the company may have served a third and perhaps more important function: The statements of company officials and employees' training histories suggest that apprenticeship programs were the training ground for various higher level positions. Of the twenty-one supervisors interviewed, for example, about one-half were graduates of the company's apprenticeship program. Many of the upper level managers who were interviewed also were former apprentices.

While the company never guaranteed an individual apprentice that he would eventually receive promotion, company representatives would "point out to prospective apprentices: 'former apprentices have risen to this or that level of management.'" The apprenticeship program provided for specific segments of time to be spent working in various departments of the company. The objective was to give each apprentice a broad based conception of the company's total operation, something not needed by journeymen.

Short Courses--Skilled and semiskilled hourly employees often participated in short courses on company time. These courses normally were conducted outside the plant on a rotation basis. Probably because of cost considerations, participation in short courses was highly selective. The company, however, was willing to pay the short course enrollment fee and worker wages where it was reasonably confident that the knowledge gained would serve one of two purposes: First, like Gisholt, other producers of machine tools and industrial equipment offered extensive training and orientation to its customers on a fee basis. According to the company, such short courses were well worth their cost since they could result in a significant reduction in maintenance costs and permit more efficient machine utilization. Second, the selective use of short courses was viewed as one way in which key production personnel could upgrade their skills and keep abreast of new technological developments. Short courses and seminars were viewed as being particularly important for workers in the maintenance department. In response to the increasing sophistication of machine tools, the company hired a private organization to conduct classes, as the need arose, in hydraulics, transmission systems and propane gas systems.

Special Upgrading Training--Aside from the small number of short courses discussed above, there were limited opportunities for blue-collar workers to receive formal training for upgrading. In our investigation, we uncovered only

one formal program, instituted only once, to serve this purpose. The previously discussed MDTA training program reserved, as part of its classroom training provisions, a small number of slots for experienced workers with significant skill deficiencies. The company believed that as a result of this program these experienced employees had become more productive workers, but company spokesmen were also quick to admit that the MDTA upgrading program reached only a small proportion of those workers needing upgrading. There was some feeling among managers that additional employee upgrading programs were required and would have been implemented, with or without government subsidy, had not economic conditions required production cutbacks and employee layoffs.

Service Training--At the time of this study, Gisholt was in the process of opening a special training center and demonstration area within the plant. The purpose of this facility was to provide a centralized location where customer training could be provided. It was anticipated that the demonstration area would also be used for Gisholt customer service and repairmen. Once completed, the demonstration area would have been Gisholt's first formal training program using the vestibule training approach.

Anticipatory Training--All of the blue-collar training programs described above, excluding the apprenticeship program, shared a common trait: They were intended to meet immediate manpower needs of varying magnitudes and types. But what of training and preparation of workers for positions which would materialize in the near future? This called for "anticipatory training," or training to remove frictions in the mobility of workers to new positions necessitated by future fluctuations in production levels or labor turnover.

Company managers made almost no systematic attempts to arrange and coordinate this type of training. There were three primary reasons: First, their knowledge of individual worker intentions was imperfect. Second, while they were able

to estimate gross manpower requirements based upon production orders, they were less able to translate these requirements into manning strategies at the work site in the short run. Similarly, change in the character of the product (particularly for contract machine tooling), rather than a change in the level of production, often required varying proportions of machine tooling procedures rather than additional workers. Third, management was contractually barred in most cases from formally transferring a worker to a new job without first posting the position and accepting employee bids.

The training for anticipated openings, as we have defined them, was best handled by first-line supervisors and foremen, since they were more capable of translating changes in production requirements into manning strategies and were usually better informed of employee intentions. The evidence gathered from discussions with foremen and company managers indicates that they and their designated trainers were providing instruction during slack periods to give workers under their jurisdiction a wider skill base. Such training gave foremen greater flexibility in meeting production quotas and removed inefficiencies stemming from immobility. Data on the extent of this practice were available only from the unofficial records of foremen.

Training Programs for Salaried Workers

As originally designed, this study did not emphasize skill acquisition among salaried workers. What information we did acquire on white-collar preparation was obtained through a small number of interviews with supervisory personnel and interviews with company managers.

Little formal training for entry level purposes existed for white-collar employees. At the lower level of white-collar occupations, that is, for clerical and office workers, occupational preparation was informal and usually given on the job. Unlike blue-collar preparation, no systematic means existed for

tabulating instructional costs--either forgone productivity or the actual cost of instruction. Typically, formal entry level training was unnecessary for supervisory and managerial personnel, professional employees, and technicians. Most of these workers acquired their present occupational status through post-secondary education and prior employment experience. The company did, however, on occasion promote highly competent blue-collar workers to lower level managerial positions. In the few cases of this practice we were able to study, the promoted blue-collar worker had acquired necessary post-secondary educational credentials at his own expense.

In sum, only as a last resort did the company train salaried workers for entry level positions; when it did, such training was highly informal and unstructured. The company's experience with NC machine programmers illustrates this point. The introduction of NC machines into the production process resulted in a large and immediate need for machine programmers--employees who translate blueprint specifications into computerized machine operations. A canvassing of local labor markets for such workers was unfruitful. Local vocational schools had not as yet added machine programming to their metal working curricula. Since machine programming assumes some knowledge of basic machine operation, it was only logical for the company to train some of its own well-qualified machine operators in the necessary programming skills. After consultations with the shop supervisors and those employees already trained in programming, a few well-qualified, semiskilled machine operators with the necessary mathematical background were selected to become machine programmers. Most of their instruction was given on the job within the machine programming department. The intent was to provide these workers with the minimal programming skill necessary to utilize the new NC units. Further refinements in programming skills, during this period, were obtained once more formal instruction could be arranged with outside training organizations.

Management Training and Seminars--Although no hard data on managerial training programs were sought, it was apparent that the company made frequent use of short seminars, courses, and conferences as upgrading programs for its managers. These programs were usually conducted by outside organizations for a specific fee. A wide range of subjects was covered in these learning situations, ranging from specific factual material on machine tool production to more general subjects such as organizational theory and managerial techniques.

Supervisory Training--Within the company, supervisory training was broadly defined to include a broad range of company-initiated activities. These included weekly conferences where foremen could exchange insights on how to improve their supervisory techniques. At times, special classes were held for supervisory personnel to introduce them to new innovations in machine tool technology and machine programming. On one occastion, supervisors also participated in a limited experiment aimed at improving the quality of on-the-job instruction. Selected foremen (as well as a small group of hourly workers) were given instruction in teaching techniques. Due to a personality conflict within the class, this program failed to achieve its stated objectives. The company did not repeat this effort, even though many managers and foremen saw the need for it.

Tuition Remission Program--Salaried employees were eligible for educational assistance grants. Each proposed course of study was evaluated as to whether it would increase employee effectiveness on his current job or prepare him for possible promotion. With the approval of the industrial relations manager, a financial grant would be issued to cover the cost of instruction and laboratory fees and a part of text book expenses. A cost refund of up to $150 per year could be claimed by each worker. From our discussion with area vocational school administrators, we received the impression that Gisholt administered its tuition refund program liberally, permitting many of its salaried employees to continue their education.

Just prior to the employment layoffs during 1970, the company voluntarily extended this tuition remission program to select groups among hourly employees. The extension covered service and repair employees as well as maintenance workers. Although we were unable to determine the exact rationale for this extension, it seemed reasonably apparent that this was another effort by the company to make upgrading programs readily available for the rapidly changing, highly skilled maintenance occupations.

The Motivation to Train: A Summary

According to a recent Manpower Administration Monograph,[6] the decision by employers to train their work forces is a multi-faceted one, with the need to meet immediate occupational shortages appearing to be the most important motivating factor. Our findings tend to confirm this conclusion for one plant within the machine tool building industry. Nearly all training was conducted to meet specific occupational vacancies as they arose.

Three aspects of occupational shortages were found to have a direct impact upon company training policies. First, there was a reduction in the quality of workers available for employment at Gisholt. Second, in an industry experiencing rapidly changing technology, the occupational mix of employment changes, requiring new skills and occupations while reducing the skill requirements of some entry level jobs. Third, occupational shortages were typically unpredictable and the employment needs were usually immediate.

For these reasons, it was necessary for the company to move toward better and quicker methods of worker preparation. As noted, there was some desire among company managers to establish greater control over the on-the-job training

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[6] Manpower Administration, U.S. Dept. of Labor, Training in Private Industry: Policies, Attitudes, and Practices of Employers in Greater Cleveland, (Washington: U.S. Government Printing Office, 1971).

process and to institute more classroom instruction. Had the plant remained in operation at a high level of production, the company would most likely have been forced to take a very close look at its training effort--how it was planned, organized, and implemented.

4. Coordination and Evaluation

The literature on training in business and industry abounds with suggestions detailing proper training practices within the firm. From a synthesis of this literature, it would appear that company training efforts should display the following general characteristics:

1. A company-wide training policy should exist, setting out in as specific terms as possible the goals of company training. Efforts should be made to communicate this policy to workers. The company training policy should be subject to regular review.

2. Special guidelines based upon general company policy should be established, specifying under what conditions the company should utilize formal training practices.

3. Training needs should be analyzed periodically. Ideally, these assessments could be part of the company's systematic manpower planning and forecasting procedures.

4. When undertaken, training should be given in its most effective and economical form, and actual instruction should be based upon sound principles of learning theory.

5. The effectiveness of training should be determined. At a minimum, training should be associated with higher or more desirable levels of worker job performance. It is also appropriate to examine the relative effectiveness of alternative training techniques.

6. Finally, since employers usually assume some part of the training costs, a thorough evaluation of employer-sponsored training should include an examination of program efficiency--that is, a comparison of benefits to costs.

From knowledge gained about training at Gisholt, company training practices did not conform to these standards. In all fairness to the firm, it should be added that very few firms offer well-planned training programs when measured against these standards. It is best, therefore, to use these standards simply as bases for discussion rather than as criteria for evaluation.

The company managers interviewed were able to point to what they believed to be official company policy on training. Their responses showed surprisingly little variance: "The company should train workers to improve their present skills levels and to permit their maximum promotability." Yet, to the best of our knowledge, this policy was never formulated or recorded in any official document. Aside from a small brochure on tuition remission programs for salaried employees, no attempt was made to formulate the general objectives of training at the plant. Persons involved in day-to-day training activities formulated training policies based upon their perceptions of historical company practices. When in doubt, these managers would seek specific guidance on training matters from higher level officials who could specify, in the words of one manager, "what they believed to be the appropriate goal of training."

Interestingly, there was no overwhelming evidence that this lack of written guidance seriously hampered company training efforts or adversely affected employee morale, at least during the many years when the company experienced no serious labor shortages. Industrial relations personnel in charge of training modeled their efforts upon precedent, training workers on the job wherever possible. As partially indicated by the data presented in the previous chapter, employees considered Gisholt's training policies as sufficient preparation for employment and as a means of acquiring occupational promotion. Nevertheless,

some sentiment for a clear-cut statement of training goals was detected among lower level managers as the company increased the number of its training activities. In addition, before employment layoffs and the eventual plant closure occurred, managers saw training as part of a movement in the direction of manpower planning and labor demand projections in response to product and labor market conditions.

At the time of this study, evaluations of training performance were minimal. Ordinarily, a trainee's immediate supervisor, in conjunction with the assigned instructor, would conduct an informal evaluation of worker competence at the end of the probationary period. Prior to this point, supervisors were not required to file oral or written trainee progress reports.

Evaluation procedures were somewhat different for the participants in the apprenticeship and MDTA-financed training programs. Detailed records on trainee progress were kept, and periodict evaluations were conducted for both groups of workers. In the case of apprenticeship, many of the evaluations of trainee performance were required by state apprenticeship laws. MDTA trainees were rated on a daily basis during the classroom component of the program. In addition, follow-up sessions with each worker and his supervisor were conducted on the job in order to guarantee the success of instruction. Both rating and follow-up procedures were required under the terms and conditions of the MDTA contract.

Finally, there were only a handful of attempts to formally assess the costs and benefits of training at the company. This finding was particularly surprising given the company's desire to use the least expensive means necessary to prepare a worker for his job. A few years previously, a special study was initiated to calculate the total cost of training to the firm, with special emphasis on the cost of on-the-job training and apprenticeship programs. But these calculations appear to have been motivated more out of curiosity than out of a desire to

evaluate training efficiency. To the best of our knowledge, a systematic study of company-specific benefits resulting from training was never made.

From the company's perspective, detailed and continuous study of training costs and benefits was to some extent unnecessary--and perhpas to a larger extent unfeasible--given the diversity of jobs represented in the plant and the nonrepetitive character of many of the tasks being performed. The absence of these comprehensive data, nevertheless, did not stop company managers from basing their decisions on what they believed to be sound benefit-cost principles, supported by intuition and logic rather than up-to-date facts.

Training Records

Official company records on training were kept only where the company felt that such data were necessary for effective monitoring and evaluation of training. Since few training programs received extensive examination, official records were meager. In on-the-job training programs, where evaluation was highly informal, company files permitted no simple way to distinguish between participants in on-the-job instruction and all new hires. Individual personnel records, as represented in Figure IV-1, did provide detailed information on job assignments and pay grade promotions, but conspicuously omitted information on the type and amount of training received.[7]

While official company records of on-the-job training were almost nonexistant, it was found that many first-line supervisors maintained informal and unofficial records of worker training and abilities. In the sample of interviewed supervisory personnel, more than 50 percent reported keeping extensive personnel records for their own use which contained information on experience, training,

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[7]The full set of detailed records kept on each worker's employment with the firm could easily have been amended to add data on worker training, even on-the-job training. Oftentimes, data on worker participation in a program were gathered, as in the case of the MDTA program, but for many reasons these data never were entered into a centralized worker training file nore were they appended to the worker's general personnel record. Chapter VI further explores the consequences of these practices.

FIGURE IV-1

INDIVIDUAL PAYROLL RECORD CARD

Progression Start Date: _____

Starting Date: _____

	Job No.	Date	
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
T.			
14.			Rate Brkt.

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abilities, and performance ratings of workers under their supervision. This finding adds some support to the proposal that first-line supervisors be used to gather on-going data on training through a system of shuttle questionnaires.

By contrast with on-the-job training data, information on other training programs was usually gathered but was not always readily available for reporting purposes. Records on apprentices and MDTA trainees were very detailed and up to date. The personnel department could easily provide the following information on both training programs: when they were conducted; how many workers started the program; how many workers completed the program; the subjects and skills learned during training; and the location of training--whether on the job or in a classroom. Less accessible were records on worker participation in short courses which usually took place outside the plant. Once again, the only source of this information was the informal record of first line foremen. Typically, it was claimed that "foremen kept this information in their heads rather than committing it to paper."

5. Mechanics of On-the-Job Training

Because on-the-job training was the most frequently used method of worker preparation and because so little is known about this method of instruction, further study of this training technique is warranted. Who actually performed the training? How was it conducted? How much time was spent in training? These and other questions could only be answered by going directly to the supervisors and persons doing the training.

All but one of the interviewed supervisors claimed that helping with new worker preparation was part of their occupational responsibilities. From these interviews it is clear that supervisors rarely discharge this responsibility alone. Most of the actual instruction was given by selected, experienced workers with supervisors providing varying degrees of guidance and control.

Among the hourly employees, 145, or 84 percent, of the interviewed hourly workers claimed to have served as on-the-job trainers. The unusually high proportion of workers with this experience can be explained by the fact that the opportunity for training increased as company employment expanded during the last decade and many workers were reporting only one or two instances where they had been asked to break in a new man.

In selecting an appropriate trainer, foremen and supervisors favored employees who demonstrated the best available knowledge of the job to be taught. Employee competence in his existing job was usually given only slight consideration. Only 8 of the 21 supervisors adopted the latter criterion in selecting an appropriate trainer. The ability of workers to teach and to communicate effectively were usually recognized as important criteria in the selection process, but rarely were they substitutes for sound knowledge of the job to be taught.

A general description of the on-the-job training process was also obtained from our interviews with supervisors and hourly employees. By and large, hourly employees serving as trainers first sought to demonstrate the job to the new or inexperienced worker. Usually, this took the form of performing the required task as trainees watched and asked questions. The demonstration phase of training took approximately one week. Nearly two-thirds of the workers claiming experience as trainers reported this demonstration approach as their basic teaching technique. Where the skill requirements of the job were low, as in the case of labor grade jobs, trainees could begin work almost immediately without extensive demonstration. These workers, then, could ask occasional questions as the need arose. Thus it appears that trainees made little contribution to production during the early phases of employment, except for those employees working at labor grade and other comparable jobs.

At the same time, however, trainers and supervisors were not in total agreement concerning the amount of guidance given trainers by supervisors in preparation

for instruction. Eighteen of the 21 supervisors claimed that they usually discussed the training and preparation needs of new and inexperienced workers with their designated trainer prior to instruction. All of the interviewed supervisors, moreover, claimed that they held private conferences with trainers to discuss the progress and problems of trainees. Yet, only 20 of the 145 trainers reported receiving supervisory guidance prior to and during training. In interpreting the claims of supervisors and trainers it is necessary to acknowledge two points. First, many of the trainers did not serve in this capacity under persons represented in the supervisory sample. Second, it is very likely that the frequency with which supervisors offered guidance did increase in more contemporary periods as a logical response to a growing company-wide concern for worker productivity.

While on-the-job training could have lasted a maximum of 520 hours for each worker entering at the starting pay grade, intuitively we could not envision instruction given any worker that required such intensive and constant attention. In fact, trainers reported spending only 44 percent of their own time in training during the trainee's first week. This was a period when trainees were expected to perform their own work as well as train. This figure, of course, differs according to the level of skill being taught. Trainers teaching skilled jobs spent about 74 percent of their time, while those teaching semiskilled jobs required about 40 percent of their time during the initial employment week. Comparable statistics for supervisors showed that those with authority over highly skilled employees spent almost 100 percent of their time giving guidance and instruction during the first week of employment. Among supervisors of semiskilled employees, about 55 percent of the first week was spent in training activities.

Both trainers and supervisors report a drastic reduction in the amount of time spent in training activities after the first week of employment. While this added time spent in instruction was claimed to vary depending upon the

difficulty of the job, the worker's ability, and his prior experience, both trainers and supervisors indicated that lost time due to added instructional responsibilities, such as spot checks and questions, was well below the amount required during the initial week. In most cases it represented a negligible loss of worker production activities.

6. Internal Training and the External Labor Market

Company training activities, as noted, were greatly influenced by local labor market conditions. Labor shorages, as related to the quantity and quality of manpower needed by the company, resulted in more extensive training, holding other things constant. But in-house training is only one of alternative options available to an employer faced with a job vacancy and an inadequate labor supply. A rational employer could (a) promote and train existing workers to fill vacancies: (b) intensify his recruitment efforts; (c) improve his selection procedures; or (d) seek to improve the quality of labor by affecting vocational school training. Evidence suggests that Gisholt employed all of these techniques to meet labor shorages of varying types.

Internal Promotion

When vacancies were small in number, the company preferred to promote existing employees rather than hire new employees. It was argued that existing workers should be given preference, where possible, for the following reasons: First, many of the jobs within sections of the production process--foundry work, machine operation, and assembly--had common skill and knowledge requirement. Successful job performance, moreover, was viewed as being in part related to knowledge of company procedures. Second, many workers, as a result of anticipatory training given by supervisors, were already fully qualified to move quickly into new jobs without substantial additional training. Third, internal promotion allowed the company to choose between workers on the basis of actual performance

and the evaluations of their supervisors. Fourth, according to the company, the reputation of the firm as "good promoter" helped attract better workers and produced high employee morale.

In interviews, managerial personnel were asked whether internal promotion was indeed as efficient as other alternatives such as seeking a qualified worker in the labor market. Based upon impressionistic evidence only, the company spokesmen claimed that experience had shown that promoted workers required less preparation time than new hires at comparable jobs.

Company Recruitment Efforts

Within a labor market dominated by white-collar employment, Gisholt experienced a favorable position as a recruiter of blue-collar workers throughout the postwar period. Residents of the immediate and surrounding communities knew of the firm by name. Over the long run, little if any direct recruiting was necessary, as word-of-mouth and direct applications at the gate produced prospective employees in ample numbers.

During periods of employment expansion following a plant layoff, intensive recruitment efforts were unnecessary because of established worker recall procedures. According to local representatives of the State Employment Service, Gisholt workers placed on layoff showed a surprising reluctance to accept employment in other industries, preferring to wait until the company recalled them. Although no quantitative data exist to document these attitudes, attachment to the company appeared to be a major obstacle in placing discharged workers during the employment contraction period prior to the plant's closing. Worker loyalties to the firm were not completely irrational, however. A system of liberal supplemental unemployment benefits helped ensure the future availability of workers. Comparable employment, moreover, could only be found if the worker was willing to commute substantial distances -- that is, 50 to 60 miles.

Recruitment was more appropriate when the demand for workers was greater than the supply of recalled workers, particularly when this demand did not involve specialized types of workers. Increased publicity and wider geographic search efforts often produced workers living on the outskirts of the labor market (in some cases 60 miles from the plant) who were willing to work for the company. These search efforts included the use of newspaper want ads, billboard signs, and Employment Service files. At the same time recruitment was relatively unfruitful when specialized workers were being sought. As in the case of machine programmers previously described, such workers rarely existed among the available supply of labor, nor was it possible to pirate them from other employers.

Of course, a "rational" employer faced with serious occupational shortages should raise wages as a major recruiting technique. There is no indication that the company used this policy in the short run, though it did maintain a favorable wage position in the market generally. For the company to have increased wages so as to attract skilled workers, the differential would have to be paid to existing employees as well (because of union agreements) and a sizable differential was required to attract new workers from other areas. Such a policy was more expensive in the long run than increasing training provisions.

Selection Practices

In addition to increased recruitment efforts, a firm can also improve its selection or screening procedures so as to ensure that hired workers will require a minimum amount of additional training. At the time of this study, Gisbolt utilized the following criteria in selecting its workers from among the supply of applicants: (1) demonstrated prior training or experience at this or related jobs; (2) knowledge of machine tools and machine procedures (e.g., the operation of measurement instruments); (3) knowledge of high school level mathematics such as algebra and trigonometry; and (4) measured mechanical aptitude and manual

dexterity. Based upon recent experience, as the number of fully qualified workers decreased, fewer applicants displayed prior employment experience and knowledge of machine tool operations. As market conditions became tighter, the company was forced to accept workers with less than adequate mathematical preparation. Understandably, the company was reluctant to lower its mechanical aptitude standards, even for jobs not directly containing mechanical tasks. Unskilled manual workers were suitable for promotion to semiskilled operative jobs only if they had minimum levels of mechanical ability.

As far as could be determined by the research inquiry, the company did not seek to develop scaled valid predictors of performance and training. The criteria outlined above had been used for many years, and there was no indication that the company planned to adopt more sophisticated selection procedures in the near future.

Relations with Vocational Schools

As part of its effort to minimize the amount of in-house training provided at company expense, Gisholt maintained good working relations with the local public vocational school (the Madison Area Technical College). The company had informal input influence on vocational school policy through the personal friendships that had developed with school personnel. More formal contributions to local school decisions and policy were made by the company through its participation on the school's official advisory board.

There is no indication that Gisholt sought to capitalize on its relationship with the local vocational school. While the graduates of the school served as a major source of employees and the school maintained specific courses of special use to Gisholt's employees, the relationship between the company and the school was of mutual benefit. In providing Gisholt with special programs, the school was fulfilling its mission of bringing services to persons and businesses within the community. At the same time, Gisholt made substantial contributions to the welfare of the school by loaning it special equipment for

instructional purposes and providing it with expertise in curriculum matters. In addition, the company would employ vocational school teachers during the summer months, thereby permitting them to keep abreast of recent developments in their respective fields.

7. The Influence of Collective Bargaining

At the time of this study, hourly employees within the plant were represented in collective bargaining by Local 1404 of the United Steelworkers of America, AFL-CIO. Bargaining unit personnel included all hourly employees, excluding employees engaged in computer programming and data processing work. Covered employees were required to join the union under terms of a union shop agreement.

As an industrial union, Local 1404 was concerned with the structure of the internal labor market and the equity of wages paid at all levels within that structure. Unlike craft unions, industrial unions do not often seek major influence over worker training, even over apprentice training. In principle at least, company-sponsored training represented to the union a means by which its members could achieve upward occupational mobility. The union was satisfied as long as the company maintained adequate and reasonable provisions for the training of promoted or newly placed workers.

Of all the training activities conducted by Gisholt, the union played its greatest role in the apprenticeship program. In 1955, soon after receiving exclusive bargaining rights, the union requested and was granted inclusion of apprentices in the bargaining unit. Recalling this period, informed sources claimed that the request was initiated for two reasons: First, there was a feeling among workers that traditional dictated apprentices be within the unit. Second, the union felt that its pragmatic interests would be best served if rules for regulating the use of apprentices on the job could be included in the collective bargaining contract.

As noted previously, the present apprenticeship program was in theory conducted under the supervision of a Joint Apprenticeship Committee (JAC), consisting of two union members and three company representatives. The committee selected applicants to the program and structured curricula. But for all intents and purposes, the actual day-to-day administration of the program was handled by the company. The union was content to take a reactive position with respect to apprenticeship; it would grieve situations it felt violated the JAC agreement or specific provisions of the collective bargaining contract, such as the practice of substituting apprentice labor for more expensive full-time workers.

The union took a similar reactive posture in situations involving training, but not necessarily apprentice training, when it felt its interests were at stake. In the process of reviewing job descriptions (a contractual right), the union attempted to have "the training requirements of job" (i.e., factor 2) increased. Oftentimes, their concern for factor 2 was logically motivated by a desire to give each job its appropriate training requirements. But it is very difficult to separate this concern from the union's desire to increase hourly pay rates during a contract by getting management to rate jobs at higher levels. The union would also react when management's training practices interfered with the regular employment of union members. On one occasion, for example, the company felt it necessary to train its service and repair workers by giving them operational experience on the job. The union grieved this practice since it was work normally conducted by other workers who were then on layoff.

A number of union goals and interests outside the training area were found to have indirect effects upon company training practices. For instance, the union's insistence upon the "rule of seniority" in personnel practices, while rationalizing the internal labor market, at the same time influenced the firm's ability to allocate labor efficiently. According to the company, promotions

based upon the rule of seniority often passed over the best man for the job--that is, the man who required the least amount of training. Similarly, bumping procedures during layoff often meant that efficient workers could be replaced by inefficient workers. As another example, union-won wage increase raised the cost of training per hour of instruction without producing a corresponding reduction in training length. As wage rates rose, a greater burden was placed upon the personnel department to recruit and select workers of higher quality. And, in a similar fashion, pressure was placed upon supervisors to speed up the training process.

CHAPTER V

THE SOURCES OF EMPLOYEE SKILLS

1. The Paths to Skill Acquisition

Because of definitional difficulties encountered in other studies of company training and skill acquisition, special efforts were made in the mail questionnaires and the personal interviews to clarify the possible categories of skill acquisition and to place the employees' responses in the correct categories. For purposes of the analysis, eight paths of skill acquisition were distinguished. It was found that most of the workers had a variety of types of training or work experience which contributed to their skill development. Although the proportions of workers in various skill classifications and specific occupations are indicated for each of the eight training-experience categories, the overlapping of some of the categories and the small numbers of employees in some of them led to a combining of forms of institutional training for a portion of the analyses. Comparisons were then made between those who indicated only institutional training as a source of their skill and those who had only on-the-job training. These categories were then compared with a third category of employees who had both institutional and on-the-job training. Those receiving institutional training, on-the-job training, and combined institutional-on-the-job training were then compared with employees who reported only prior occupational experience, without training, as a possible method of skill acquisition for their jobs at Gisholt. Finally, employees in the three training categories and the occupational experience category were compared with employees who had neither training nor occupational experience in the job which they first took at the Gisholt Company.

In analyzing the training and experience which contributed to skill development after employees began their work at the Gisholt Company, it was possible to

distinguish those employees who received company-sponsored classroom instruction from those who received formal training on the job as well as from those who received neither type of training.

The training activities classified as "institutional" included courses and instruction which were not sponsored by private industry or connected with the worker's place of employment. Six categories of training were listed, and respondents were asked whether they had used any of these methods to obtain skills and occupational knowledge. As a check on the formality of the training for each of the training categories checked, the respondents were asked to indicate the occupation, trade, or skill which they learned in that training program. They were also asked to indicate the dates of the training programs, the number of weeks or months of training received, the costs of the training, if any, and whether the respondent felt that the training helped him to get his first job at the Gisholt Company. The six categories were as follows:

1. Vocational, technical, industrial arts education while still in high school.
2. Post-high school vocational or technical training in a vocational school or junior college (not including apprenticeship training).
3. An apprenticeship program. (Although it has been recognized that apprenticeship training occurs primarily on the job, it was classified among the institutional training programs because it customarily includes a period of related instruction in vocational or technical institutions, because of its formality, and because such institutions as unions and government frequently play a role in apprenticeship programs.)
4. A government-sponsored retraining program (nonmilitary).
5. Correspondence school courses.
6. Training courses taken while in the armed forces, other than basic training.

Information on the categories of training and skill acquisition obtained on the job was obtained by asking each respondent if the employer trained him to do the particular job which he designated as having prior to his employment at Gisholt, or at the Gisholt Company. The respondent was asked approximately how much training and instruction he needed in order to learn this particular job and approximately how much additional practice and experience he needed to feel reasonably competent in doing this job after his training and instruction ended. If the respondent indicated that he had received no training from the employer, he was asked how he learned to do the particular work which he designated. He was also asked if he thought his experience on the designated job helped him to get his first job with the Gisholt Company. Utilizing the responses to these questions, as well as a comparison of the pre-Gisholt occupations with the first and highest-paying job held at Gisholt, the following two categories of on-the-job training or experience were defined:

7. Prior employment experience in the occupation of the employee's first Gisholt job. In determining whether the prior employment was in an occupation related to the worker's job at Gisholt, occupational categories and skill levels indicated in the Dictionary of Occupational Titles were used.

8. The employer provided some occupational training on the job indicated above. (In an effort to distinguish on-the-job training from simple work experience or "learning by doing," employees were asked in the personal interview to specify the methods used by the employer to train them on the job. They were asked to specify the number of hours, days, or weeks of classroom instruction connected with this on-the-job training; and they were asked to specify the number of hours, days, and weeks in which they received instruction from their supervisors or fellow workers on the

job. They were also asked to indicate the amount of additional practice and experience which they needed after training in order to feel reasonably competent in doing the job.)

2. Training and Skill Acquisition Prior to Employment at the Gisholt Company

In the analysis of pre-Gisholt training and skill acquisition, the respondents were divided into five occupational-skill groups--skilled craftsmen, apprentices, operatives, clerical workers, and laborers--on the basis of their first jobs at the Gisholt Company. The comparison of alternate training and experience paths was first made in terms of the five broad occupational classifications in order to provide a picture of the differences in skill preparation for the various occupational groups. These descriptive statistics are presented in Tables V-1 and V-2. A more detailed comparison of training paths for specific occupations within each of the skill classifications is presented in Tables V-3 to V-6. Finally, Tables V-7 to V-9 present the results of regression analyses of the factors influencing the probabilities that employees would have had institutional or on-the-job training prior to their Gisholt employment.

Prior Training and Skill Classification

As is seen in Table V-1, formal institutional training was much more important than on-the-job training in developing skills of Gisholt employees prior to their employment with the company. Only 3 percent of the skilled craftsmen, 6 percent of the operatives, and 4 percent of the laborers had received on-the-job training in an occupational skill related to their first jobs at Gisholt. None of the small number who began as apprentices at Gisholt had had previous on-the-job training in their apprenticeship occupation, and only 4.5 percent of the clerical workers had received prior on-the-job training in clerical work. On the other hand, substantial proportions of the workers in each of the skill categories had received formal vocational instruction in the occupational skill of their first jobs

TABLE V-1

SUMMARY OF PRE-GISHOLT VOCATIONAL TRAINING AND RELATED EXPERIENCES: PROPORTION OF HOURLY EMPLOYEES REPORTING VOCATIONAL TRAINING OR RELATED EMPLOYMENT EXPERIENCES ACQUIRED BEFORE JOINING GISHOLT, BY TYPE OF TRAINING OR EXPERIENCE AND OCCUPATION OF FIRST GISHOLT JOB

Type of Vocational Training or Related Employment Experiences	Occupation of First Gisholt Job				
	Skilled Craftsmen	Apprentices	Operatives	Clericals	Laborers
1. Vocational or technical education taken in high school	29.6%[a]	--	27.3%	25.0%	18.0%
2. Vocational or technical education taken in a post-high school vocational or technical school or jr. college (not including apprenticeship)	12.6	100.0	12.6	27.3	11.0
3. Apprenticeship	9.3	60.0	3.2	2.3	11.0
4. Government retraining program	2.1	--	3.9	2.3	4.0
5. Correspondence courses	1.3	--	18.6	2.3	4.0
6. Vocational training received while in armed forces (other than basic training)	24.1	60.0	22.9	22.7	14.0
7. Prior employment experience in the occupation of first Gisholt job	38.9	--	33.2	29.5	14.0
8. Employer provided occupational training in the employment experience represented in #7	3.0	--	5.9	4.5	4.0
9. No training or related employment experience	1.3	--	--	--	20.0
N	237	5	253	44	100

[a]Totals do not add to 100.0 percent since responses are not mutually exclusive.

at Gisholt. This vocational education occurred either at the high school level or in a post-high school vocational school, technical institute, or junior college. Almost 30 percent of the skilled craftsmen had taken vocational courses in high school, and one-fourth or more of the clerical workers and semiskilled operatives had had high school vocational education. Even 18 percent of the unskilled laborers reported that they had taken high school vocational courses. Slightly smaller proportions of the skilled craftsmen and operatives had taken vocational courses at the post-high school level (12.6 percent), but an even larger number (27.3 percent) of the clerical employees had taken vocational courses in post-high vocational schools, technical institutes, or junior colleges. All of the apprentices had received some related instruction in post-high school institutions and 11 percent of the laborers had taken post-high school vocational courses.

The proportion of Gisholt employees who had had vocational training while in the armed forces was almost as large as the proportion who had received vocational instruction in high school. Almost one-fourth of the skilled craftsmen and more than one-fifth of the semiskilled operatives and clerical workers reported that they had received vocational training in the armed forces. Only 7 percent of the unskilled laborers were in this category, but a relatively large proportion of the few beginning apprentices indicated that they had received this type of institutional training before their employment at Gisholt.

Even though there were only five employees who began their first Gisholt jobs as apprentices, 9.3 percent of the 237 skilled craftsmen in the sample had received apprenticeship training prior to their employment at the company. Only 2-3 percent of the clerical workers and operatives had had previous apprenticeship training, but over half of the beginning apprentices at Gisholt had had apprenticeship training prior to Gisholt; it is notable that 11 percent of the unskilled laborers at Gisholt had had prior apprenticeship training. Of course, those

outside of the skilled craftsmen group did not complete their full apprenticeship before taking their Gisholt jobs.

A relatively small proportion of the employees at Gisholt had taken a government-sponsored retraining program prior to their employment at the company. None of the beginning apprentices were in this category, and only 2-4 percent of those in other skill classifications had previously enrolled in courses provided by the Manpower Development and Training Act or similar publicly-supported retraining courses.

The percentage who acquired occupational skills through correspondence courses was also relatively small in each of the classifications except that of the operatives. In this skill group, 18.6 percent reported that they had received vocational instruction through correspondence courses.

Among the craftsmen, operatives, and clerical workers, a large proportion reported that they had had previous employment experience in the occupational category of their first Gisholt job, but that they had received no training on the job. The proportion of the employees in this category was greater than that in the other seven training and/or experience categories. Almost 40 percent of those who were skilled craftsmen on their first Gisholt jobs had prior employment experience in the same occupational classification. Although fewer operatives and clerical employees had similar occupational experience prior to Gisholt, the percentages (33.2 and 29.5 percent, respectively) were impressive. However, only 14 percent of the unskilled laborers and none of the beginning apprentices had had previous employment experience in the same occupation as their first Gisholt jobs.

Thus, their investment in skill development prior to their Gisholt employment, when employees are classified by skill, is as one might expect. Larger proportions of skilled craftsmen had had formal institutional training in

vocational schools, the armed forces, and apprenticeship programs; and larger proportions also had had prior employment experience, presumably "learning by doing," in a related occupation even though relatively few had received formal on-the-job training prior to their Gisholt employment. The total prior investment in skill development by semiskilled operatives and clerical employees was roughly similar, and in both cases it was below the level reported by skilled craftsmen. While workers in both of these groups had had a substantial amount of institutional training not connected with their places of employment, the major differences between the two groups were in the larger proportion of post-high school vocational education for the clerical employees and the larger proportion of training through correspondence courses reported by the operatives. Fewer of the operatives and clerical employees, as compared with skilled craftsmen, had had prior employment in an occupation related to their first Gisholt jobs, and on-the-job training was reported by only a slightly larger proportion of semiskilled workers relative to skilled workers. As might be expected, the total prior investment in skill development was lower for the laborers than for the more skilled occupational groups. Institutional training was considerably less, and there were even greater differences in the extent of related job experience for the unskilled workers.

Although a more rigorous analysis of the factors associated with the various training paths is presented at the conclusion of this section, it is interesting to note the differences in age, education, and initial employment date for each of the skill groups and each of the training/experience categories. These are presented in Table V-2.

Seniority at Gisholt, as measured by the starting date of employment, was associated with the type of prior training or experience of the employees, but the relationship was not consistent throughout the various occupational categories.

TABLE V-2

ASSOCIATED MEANS FOR TABLE V-1: YEAR STARTED WITH COMPANY, AGE WHEN FIRST EMPLOYED BY COMPANY, AND EDUCATIONAL ATTAINMENT FOR WORKERS REPORTING TRAINING, BY TYPE OF TRAINING REPORTED

Type of Vocational Training or Related Employment Experiences	Skilled Craftsmen	Apprentices	Operatives	Clericals	Laborers
1. High school voc. ed.					
year started	1960	--	1961	1957	1966
age at time of job	25.9	--	25.4	24.9	30.6
education (yrs)	12.1	--	11.7	12.4	12.3
2. Post-h.s. voc. ed.					
year started	1964	1959	1959	1955	1966
age at time of job	29.1	26.7	27.5	25.5	36.5
education (yrs)	11.5	11.2	11.7	12.4	12.0
3. Apprenticeship					
year started	1959	1961	1959	1959	1959
age at time of job	35.1	24.0	30.9	27.0	41.3
education (yrs)	11.2	11.0	11.2	12.0	12.0
4. Govt. retraining					
year started	1966	1966	1956	1969	1952
age at time of job	30.5	33.0	32.2	36.0	30.0
education (yrs)	12.0	12.0	10.0	12.0	8.0
5. Correspondence					
year started	1963	--	1962	1969	1964
age at time of job	33.0	--	33.6	36.0	29.0
education (yrs)	10.7	--	11.3	12.0	9.0
6. Armed forces					
year started	1962	1964	1962	1961	1961
age at time of job	27.8	22.0	28.3	26.9	22.2
education (yrs)	11.7	11.0	11.2	11.8	12.0
7. Prior employment exp.					
year started	1957	--	1961	1957	1965
age at time of job	31.9	--	27.9	29.4	34.7
education (yrs)	11.2	--	11.2	12.2	11.2
8. Prior employment plus training					
year started	1959	--	1958	1959	1960
age at time of job	33.3	--	29.0	30.5	50.0
education (yrs)	11.2	--	11.2	12.2	11.2

For those who reported prior vocational education in high school or in post-high school institutions, the average starting year for skilled craftsmen was in the early 1960s and in 1966 for laborers, whereas operatives who had had prior vocational education began their employment at Gisholt, on average, in 1959-61; the clerical employees started even earlier--in the 1955-57 period.

Although the numbers who had enrolled in an apprenticeship program, government retraining, or correspondence courses were too small in most skill categories to provide meaningful averages, it is notable that those in both the skilled and unskilled occupational groups who had taken apprenticeship training before their Gisholt employment had an average starting date at Gisholt of 1959. In all the skill categories, the average starting date for those who reported vocational training in the armed forces was in the early 1960s--from 1961 to 1964.

The skilled craftsmen who reported that they had acquired their skills by prior job experience or training had somewhat higher average initial employment dates than the skilled workers who had taken various forms of prior institutional training. This was not true of the laborers, who, on the whole, had later average starting dates than those in other occupational groups. Similarly, clerical employees and operatives who reported prior employment experience in a related occupation started work at the company, on average, at about the same time as those who took prior vocational courses in the schools.

The average age of the Gisholt employees when they first began their work with the company differed more within the various occupational groups than between them. However, the apprentices began their employment at Gisholt at a somewhat earlier age and the laborers began at a somewhat later age than the other occupational groups (Table V-2). In each occupational group, those who reported vocational courses in high school started their employment at Gisholt at an earlier age than those who reported their vocational education in post-secondary schools. Similarly, in each of the occupational groups, those who reported that

they had received on-the-job training were older than those who had received formal vocational education, and they were also older, on average, at the time of their initial employment than those who simply reported prior employment experience in a related occupation.

As in the case of their seniority dates at Gisholt, it is interesting to note that among both the skilled craftsmen and the unskilled laborers, those who had taken apprenticeship training prior to their Gisholt jobs began their work at Tisholt at a relatively high age--35 and 41 years, respectively.

As seen in Table V-2, there is little consistent difference in the average educational level of employees in the various skill categories or in the various training/experience categories. Except for the few who reported that they had taken government retraining courses or correspondence courses, the average age in the various training and occupational classifications ranged from 11 to 12.4 years of formal education. There was little distinction in the average educational levels of those who reported vocational education in high school as compared with post-high school institutions; and there was little difference between the average age of those with formal training and those reporting training on the job or job-related experience prior to their Gisholt employment.

Prior Training and Experience of Skilled Craftsmen

When the 237 skilled craftsmen in our sample are classified by specific skilled occupation of their first Gisholt jobs, only the machinist, tool-and-die maker, mold maker, foreman, and service repair representative groups have sufficient numbers of permit meaningful comparisons of prior training and experience paths. The machinists, tool-and-die makers, and service repair representatives had larger proportions with prior vocational education in high school or post-high school institutions than did the other skilled craftsmen (see Table V-3). On the other hand, these three skilled trades reported less prior experience

TABLE V-3

CRAFTSMEN CLASSIFIED BY SPECIFIC OCCUPATION AND PRE-GISHOLT TRAINING AND EXPERIENCE

Type of Vocational Training & Related Emp. Experience	N[a]	Number and Percentage Entering at Occupation: Heat Treaters	Machinist	Pipe Fitter & Plumber	Tool-&-Die Maker	Mold Maker	Foremen & Supervisors	Sheet metal Workers	Service Repair Reps.
1. High school voc. ed.	70 (29.6)[b]	2 (28.5)[c]	11 (32.3)	--	32 (34.0)	2 (6.0)	4 (16.7)	4 (66.7)	15 (40.5)
2. Post-high sch.	30 (12.6)	-- --	5 (14.7)	--	8 (8.5)	2 (6.0)	4 (16.7)	-- --	11 (29.7)
3. Apprenticeship	22 (9.3)	2 (28.5)	4 (11.8)	--	12 (12.7)	2 (6.0)	-- --	-- --	2 (5.4)
4. Govt.retraining	5 (2.1)	-- --	3 (8.8)	--	2 (2.1)	-- --	-- --	-- --	-- --
5. Correspondence	3 (1.3)	-- --	-- --	-- --	-- --	3 (9.1)	-- --	-- --	-- --
6. Armed forces	57 (24.1)	2 (28.5)	9 (2.6)	--	21 (22.3)	4 (12.2)	6 (33.3)	2 (33.3)	13 (35.1)
7. Prior employment experience	92 (38.9)	7 (100.0)	7 (20.6)	--	26 (27.7)	24 (73.7)	15 (62.5)	2 (33.3)	11 (29.7)
8. Prior employment & training	7 (3.0)	-- --	4 (11.8)	--	3 (3.2)	3 (9.1)	-- --	-- --	-- --
9. Total no. in occupation	237	7	34	2	94	33	24	6	37

[a] "N" equals the total number of all skilled workers reporting the specific vocational training or related employment experience. Totals do not necessarily equal the total number in the occupation because responses are not mutually exclusive.

[b] Numbers in parentheses are the equivalent values of each cell as a percentage of all skilled workers taken from Table V-1.

[c] Numbers in parentheses are percentage of all workers in the specific skilled worker occupations, that is, percentage of item 9.

in related occupations than did the craftsmen group as a whole. Only the machinists, tool-and-die makers, and mold makers reported that they had received any prior on-the-job training. However, even in these occupational classifications, the number reporting on-the-job training prior to their Gisholt jobs was relatively small.

Apprenticeship training prior to Gisholt contributed to the skill development of a surprisingly small number of skilled craftsmen in the various occupations. Only among the tool-and-die makers, where 12 of the 94 (12.7 percent) had been apprentices, was this a significant skill path. Apprenticeship was reported as a source of skill development for only two of the seven heat treaters, four of the 34 machinists, two of the 33 mold makers, and two of the 37 service repair representatives. In contrast with the evidence provided in other studies, it is interesting to note that none of the foremen and supervisors, who were included in the Gisholt survey, reported that they had had apprenticeship training prior to Gisholt. The most important source of skill development for this group, as well as for the mold makers and the heat treaters, was simply prior employment experience in the same or a related occupation. However, more of the supervisors had taken their apprenticeship after employment at Gisholt.

The importance of training in the armed forces, notable in our discussion of the skilled craftsmen as a whole, is further emphasized in the occupational preparation of the foremen, sheet metal workers, and service repair representatives. It appears that the Gisholt Company was able to reap the benefits from substantial formal training of their skilled workers in vocational schools and the armed forces, as well as the benefits of informal "learning by doing" in other establishments before the skilled craftsmen moved to the Gisholt Company.

The Training and Experience of Semiskilled Operatives

As seen in Table V-4, of the 253 operatives included in our survey, the 176 machine operators were by far the most numerous and tended to dominate the results

TABLE V-4

SEMISKILLED OPERATIVES CLASSIFIED BY SPECIFIC OCCUPATION, PRE-GISHOLT TRAINING AND EXPERIENCE

Type of Pre-Gisholt Vocational Training & Related Employment Experience	N[a]	Number and Percentage of All Semiskilled Workers Entering With Occupation in:				
		Foundry & Metal Treating	Machine Assembly	Electrical Component Sub-Assembly	Machine Operator	Other
1. High school voc. ed.	69 (27.3)[b]	2 (11.7)[c]	9 (39.1)	6 (30.0)	49 (27.8)	3 (17.6)
2. Post-high school	32 (12.6)	1 (5.9)	3 (13.0)	6 (30.0)	20 (11.5)	2 (11.8)
3. Apprenticeship	8 (3.2)	2 (17.1)	-- --	-- --	5 (2.9)	1 (5.9)
4. Govt. retraining	10 (3.9)	1 (5.9)	2 (8.7)	1 (5.0)	6 (3.5)	1 (5.9)
5. Correspondence	47 (18.6)	-- --	7 (30.4)	17 (85.0)	21 (12.1)	2 (11.8)
6. Armed forces	58 (22.9)	3 (17.6)	5 (21.7)	9 (45.0)	40 (43.0)	1 (5.9)
7. Prior employment experience	84 (33.2)	5 (29.4)	8 (34.8)	10 (50.0)	54 (31.2)	7 (41.2)
8. Prior employment & training	15 (5.9)	1 (5.9)	3 (13.0)	1 (5.0)	9 (5.2)	1 (5.9)
9. Total no. of workers in this occupation	253	17	23	20	176	17

[a] "N" equals the total number of all semiskilled operatives reporting the specific vocational training or related employment experience. Totals do not necessarily equal the total number in the occupation because responses are not mutually exclusive.

[b] Numbers in parentheses are the equivalent values of each cell as a percentage of all semiskilled operative workers taken from Table V-1.

[c] Numbers in parentheses are the percentages of all workers in the specific semiskilled occupational group, that is, percentage of item 9.

for the entire semiskilled group. The smaller numbers who worked in machine-assembly and electrical component subassembly reported a higher proportion of vocational education in the schools (42 percent and 60 percent, respectively) than the machine operators or the semiskilled workers as a whole (approximately 39 percent).

As in the case of the skilled craftsmen, the importance of vocational training in the armed forces is emphasized as a source of skill development for semiskilled operatives, especially in the case of the machine operator group. Here, 43 percent had vocational training in the service as compared with the smaller percentage who had taken vocational training in high school and post-high school institutions. Those engaged in electrical component subassembly also reported a relatively high incidence of training in the armed forces (45 percent).

Although prior employment experience was less important for the machine operators and the semiskilled group as a whole than it was for skilled craftsmen, this form of skill development was reported by a relatively high proportion of the assembly workers, especially those in electrical component assembly (50 percent).

Prior Training and Experience of Clerical Workers

The clerical employees in our sample were roughly evenly divided between stockroom employees and office machine operators. There was considerable variation in the methods by which they acquired their skills for their initial employment at the Gisholt Company. Stockroom clerks received their vocational education primarily at the high school level, and office machine operators took vocational courses primarily in post-high school institutions such as technical institutes and junior colleges. However, formal vocational schooling was important for 50 percent or more of both groups (see Table V-5). The other major contrast in the preparation of the two groups is found in the larger proportion of office machine

TABLE V-5

CLERICAL WORKERS: NUMBER AND PERCENTAGE OF WORKERS ENTERING AS CLERICAL WORKERS REPORTING PRE-GISHOLT VOCATIONAL TRAINING AND RELATED EMPLOYMENT EXPERIENCES BY TYPE OF EXPERIENCE AND TYPE OF CLERICAL JOB

Type of Vocational Training and Related Employment Experience	Number and Percentage of All Clerical Workers With Occupation: N[a]	Stockroom Work	Office Machine Operator
1. High school vocational education	11 (25.0)[b]	8 (38.1)[c]	3 (13.0)
2. Post-high school	12 (27.3)	4 (19.0)	8 (34.8)
3. Apprenticeship	1 (2.3)	-- --	1 (4.3)
4. Government retraining	1 (2.3)	-- --	1 (4.3)
5. Correspondence	1 (2.3)	-- --	1 (4.3)
6. Armed forces	10 (22.7)	4 (19.0)	6 (26.1)
7. Prior employment experience	13 (29.5)	3 (14.5)	10 (43.5)
8. Prior employment & training	2 (4.5)	-- --	2 (8.6)
9. Total no. of workers in this occupation	44	21	23

[a] "N" equals the number of all clerical workers reporting the specific vocational training or related employment experience. Totals do not necessarily equal the total number in the occupation because responses are not mutually exclusive.

[b] Numbers in parentheses are the equivalent values of each cell as a percentage of all clerical workers taken from Table V-1.

[c] Numbers in parentheses are percentages of all workers in the specific clerical occupation, that is, item 9.

operators (43.5 percent) who had prior employment experience in this occupation, as compared with only 14.3 percent for the stockroom clerks.

It is clear that clerical work that is closely related to the productive process, such as stockroom work, is distinguished from the standpoint of skill preparation from the type of clerical work performed by office machine operators.

Prior Training and Experience of Unskilled Labor

As noted in Table V-1, one-fifth of the unskilled labor group reported no previous training or related employment experience. Table V-6 indicates the previous training and employment experience of guards and janitors, packers, and other unskilled labor who reported such experience. The guards and janitors were much more likely to have had formal vocational training in high school, a post-high school institution, or an apprenticeship program than were the packers and other laborers. Twenty-eight percent of the former group indicated some formal training. On the other hand, the armed forces provided from one-fifth to one-fourth of the packers and other laborers with some occupational training. Although 17.5 percent of the guards and janitors and almost 22 percent of the packers had some prior employment experience in an occupation related to that of their first Gisholt jobs, this was not true of other laborers; only the guards and janitors reported that they had received any training on the previous related job.

Determinants of Training and Type of Training Prior to Gisholt[1]

For the total sample of Gisholt workers, age at the time of first employment with the Gisholt Company, length of service with the company, educational level,

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[1]This section employs ordinary least squares regression (OLS) in order to isolate the effects of several independent variables on selected dependent variables. In many instances, the dependent variable is defined as the probability of an event, but in actuality it is a dichotomous variable assuming values of either one or zero. Utilization of OLS in such cases violates many of the assumptions underlying regression procedures. Nevertheless, experimentation with such suitable substitute procedures as Probit Analysis, does not yield substantively different results--and, in fact, equations estimated using OLS are preferable, since Probit equations are extremely difficult to interpret. Appendix D offers a comparison of equations produced by the two methods.

TABLE V-6

LABORERS CLASSIFIED BY SPECIFIC OCCUPATION AND BY PRE-GISHOLT TRAINING AND RELATED EXPERIENCE

Type of Vocational Training and Related Employment Experience	Number and Percentage of All Workers Entering with Occupation:			
	N[a]	Guards & Janitors	Packers	Other Laborers
1. High school vocational ed.	18 (18.0)[b]	12 (31.0)[c]	6 (18.8)	-- --
2. Post-high school	11 (11.0)	8 (20.0)	3 (9.4)	-- --
3. Apprenticeship	11 (11.0)	8 (20.0)	3 (9.4)	-- --
4. Government retraining	4 (4.0)	-- --	-- --	4 (14.3)
5. Correspondence	4 (4.0)	-- --	-- --	4 (14.3)
6. Armed forces	14 (14.0)	-- --	7 (21.9)	7 (25.0)
7. Prior employment experience	14 (14.0)	7 (17.5)	7 (21.9)	-- --
8. Prior employment & training	4 (4.0)	4 (10.0)	-- --	-- --
9. Total no. entering at this occupation	100	40	32	28

[a] "N" equals the total number of all unskilled workers or laborers reporting the specific vocational training or related employment experience. Totals do not necessarily equal the total number in the occupation because responses are not mutually exclusive.

[b] Numbers in parentheses are the equivalent values of each cell as a percentage of all unskilled workers taken from Table V-1.

[c] Numbers in parentheses are percentages of all workers in the specific unskilled occupation, that is, percentage of item 9, excluding those who reported no prior training or related work experience.

and skill level were significant determinants of the probability that the employee would have had some training prior to his Gisholt job (Table V-7).[2] Workers who began their employment at Gisholt when they were under 21 years of age were less likely to have had training than those in the 21-25 year age group. These differences are significant at the .01 and .05 levels. Although the regression coefficients indicate that increasing age at the time of initial employment, that is, 26 years of age or over, increases the probability that the worker would have had some prior training, these differences are not significant at the .01 or .05 levels.

The probability of prior training is greater for those who began their Gisholt employment after World War II than for those who started work before the war (Table V-7). When other factors, such as age, are held constant in a regression analysis of the entire sample of workers, it is found that the coefficients indicating the probability of prior training are greatest for the period 1946-50 and 1966-70, as compared with the prewar period. These differences are significant at the .01 and .05 levels.

The completion of high school significantly increased the probability that employees had received prior training. In the regression analysis for the entire sample (Table V-7), with employees having less than 10 years of education serving as the base reference group, all those in higher educational categories had positive coefficients indicating increased probability of prior training, with the exception of workers in the category of 15-16 years of education--that is, those having or approaching a university degree.

With other factors held constant, the probability that skilled craftsmen would have had prior training is significantly greater (at the .01 level) than that of unskilled labor. Semiskilled operatives and clerical employees also have greater probabilities of prior training then unskilled workers, but these

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[2]Coefficients are said to be significant if their corresponding t values are statistically significant at a minimal level of .10.

TABLE V-7

DETERMINANTS OF THE PROBABILITY OF HAVING TRAINING PRIOR TO EMPLOYMENT AT THE GISHOLT MACHINE COMPANY[a]

Variable	Regression Coefficient	Standard Error
Age at time of first Gisholt job:[b]		
under 17	-.198	.100*
18 - 20	-.178	.054**
26 - 30	.083	.055
over 30	.028	.049
Year started with company:[c]		
1940-1945	.003	.102
1946-1950	.317	.128**
1951-1955	.247	.101**
1956-1960	.226	.104*
1961-1965	.270	.091**
1966-1970	.307	.091**
Educational attainment:[d]		
10 - 11	.101	.067
12	.183	.038**
13 - 14	.118	.090
15 - 16	-.004	.131
Size of city of birth[e]	-.002	.008
Born in Wisconsin (1,0)	.010	.047
Occupational level of first Gisholt job:[f]		
Craftsmen (skilled)	.158	.055**
Operative (semiskilled)	.067	.055
Clerical (semiskilled)	.098	.084
Constant	.223	.116*
R	.33**	
S.E.E.	.45	
N	639[g]	

Footnotes to Table V-7:

[a]For purposes of this regression, and those in Tables V-8 and V-9, training programs are defined as worker participation in any of these training activities: (1) high school vocational or technical education courses; (2) post-high school vocational or technical courses; (3) correspondence school courses; (4) government retraining programs; (5) apprenticeship; (6) armed forces training other than basic training and advanced infantry school; and (7) training in the occupational duties and responsibilities of the first job held with Gisholt by a prior employer.'

[b]Referenced to workers who started working at Gisholt when they were 21-25 years of age.

[c]Referenced to workers who started at Gisholt before 1940.

[d]Referenced to workers with less than 10 years of educational attainment.

[e]City size is coded as follows: 0 = rural or unincorporated; 1 = incorporated place under 2,500; 2 = 2,500-9,999; 3 = 10,000-24,999; 4 = 25,000-49,999; 5 = 50,000-99,999; 6 = 100,000-249,999; 7 = 250,000-999,999; 8 = 1,000,000 plus.

[f]Referenced to workers with unskilled entry level jobs.

[g]Twenty observations have been omitted due to nonascertained information.

*Significant at the .05 level.

**Significant at the .01 level.

differences are not significant at the .01 or .05 levels. The size of the employee's city of birth and whether or not he was born in Wisconsin have no significant effect on the probability of his prior training.

Probability of Prior Training by Skill Category--In separate regressions for each of the four skill categories, the findings on the effects of age, starting year, and educational attainment on the probability of prior training are generally confirmed. However, there are also some interesting differences among the occupational groups (Table V-8).

For skilled craftsmen, a starting age of over 26 does not significantly increase the probability that the employee had had prior training. However, there is a highly significant decrease in the likelihood of prior training for those in the 18-20 year bracket as compared with the base group in the 21-25 age

TABLE V-8

DETERMINANTS OF THE PROBABILITY OF HAVING TRAINING PRIOR TO EMPLOYMENT AT THE GISHOLT MACHINE COMPANY, BY OCCUPATION OF FIRST JOB WITH COMPANY

Variable	Regression Coefficient and Standard Error[a]			
	Skilled Craftsmen	Semiskilled Operatives	Clerical	Unskilled Laborers
1. Age at time of first Gisholt job[b]				
a. under 17	-.145 (.176)	-.274 (.197)	-.469 (.401)	-.157 (.197)
b. 18 - 20	-.324 (.188)**	-.002 (.086)	-.166 (.226)	-.413 (.138)
c. 26 - 30	.046 (.081)	-.075 (.092)	-.075 (.248)	.299 (.157)
d. over 30	-.095 (.071)	.059 (.086)	-.179 (.220)	.124 (.127)
2. Year started first Gisholt job[c]				
a. 1940 - 1945	-.253 (.162)	-.009 (.163)	.172 (.341)	.815 (.322)**
b. 1946 - 1950	.189 (.178)	.384 (.206)	.711 (.665)	I.O.R. (——)
c. 1951 - 1955	.182 (.157)	.320 (.163)*	.084 (.384)	.447 (.315)
d. 1956 - 1960	.207 (.169)	.272 (.168)	.351 (.403)	.463 (.294)
e. 1961 - 1965	.140 (.140)	.316 (.146)*	.281 (.367)	.748 (.288)**
f. 1966 - 1970	.228 (.144)	.353 (.144)*	.158 (.314)	.790 (.282)**
3. Educational attainment (years of school completed)[d]				
a. 10 - 11	.108 (.096)*	.002 (.124)	.406 (.643)	.416 (.147)**
b. 12	.190 (.083)	.030 (.107)	.751 (.549)	.297 (.133)**

TABLE V-3 (continued)

Variable	Regression Coefficient and Standard Error			
	Skilled Craftsmen	Semiskilled Operatives	Clerical	Unskilled Laborers
c. 13 - 14	.090 (.128)	.049 (.156	.654 (.597)	-.031 (.296)
d. 15 - 16	.436 (.198)*	-.243 (.358)	.124 (.613)	.006 (.306)
4. Size of city of birth	-.011 (.012)	-.006 (.014)	-.015 (.044)	-.034 (.020)
5. Born in Wisconsin (1,0)	.050 (.066)	-.031 (.094)	.381 (.248)	-.157 (.106)
6. Constant	.527 (.164)**	.344 (.190)	-.359 (.679)	-.145 (.296)
R	.41**	.30	.66	.59**
S.E.E.	.40	.47	.45	.44
N	242	253	44	100

[a]Standard errors appear in parentheses.

[b]Referenced to workers 21-25 years of age.

[c]Referenced to workers who started with company before 1940.

[d]Referenced to workers with less than 10 years of schooling.

*Significant at the .05 level.

**Significant at the .01 level.

I.O.R. = Insufficient observations in cell for regression.

bracket. Although the coefficients indicate increased probability of prior training for those who started their employment after World War II, in the case of skilled craftsmen these differences are not statistically significant. Unlike the sample as a whole, the regression for skilled craftsmen indicates that all education beyond the tenth year increases the probability of prior training, but the coefficients are significant only for those in the 10-11 and 15-16 years-of-education categories.

Age appears to have no significant effect on the probability of prior training for semiskilled operatives. However, the year of initial employment at Gisholt does. Those who began work after World War II are more likely to have had training prior to their employment, and the increased probability is significant at the .05 level for those who began their Gisholt jobs in the 1960s. Education beyond the 10th grade increases the probability of prior training for semiskilled operatives, except for those who completed their junior and senior years in college or university. However, these differences are not statistically significant at the .01 or .05 levels.

The existence of prior training is most likely for those clerical employees in the 21-25 age group at the time of their initial employment at Gisholt. They are more likely to have had prior training if they began their employment after World War II, with the largest coefficients in the 1946-50 and 1956-60 periods. Education beyond the 10th grade also increases the probability of prior training for clerical employees. Because of the small number of clerical employees in the sample, these differences are not found to be statistically significant at the .05 level.

Unskilled workers over 20 years of age, especially in the 26-30 year category, are more likely to have had prior training than laborers who began their employment at Gisholt when they were younger. Unlike the other skill categories, unskilled workers who began their Gisholt employment during the 1940-45 period were

more likely to have had prior training than those who started work before 1940. The probabilities of prior training were also considerably increased for those who began work in the 1960s. These differences are statistically significant at the .01 level. The probability of prior training is also significantly greater for laborers who completed high school as compared with those who dropped out prior to the 10th grade. However, college or university education for laborers did not significantly increase the probability that they had had training prior to their Gisholt employment.

Determinants of the Type of Prior Training--When separate regression analyses of the probabilities of prior training are made for on-the-job, institutional, and on-the-job-institutional training taken separately (Table V-9), it was found that higher starting ages (beyond 21 years) increased the probability that the employee would have had each of these types of prior training before Gisholt. For those in the 18-20 age group, the probability of on-the-job, institutional, or on-the-job-institutional training is significantly less than in the case of the 21-25 age group. The increased probability of prior on-the-job training for those in the 26-30 age group is statistically significant at the .05 level.

The increased probability of on-the-job training is statistically significant (at the .05 level) only for that group which started employment in the 1966-70 period. However, the increased probability of prior institutional training or prior institutional training combined with on-the-job training is significantly increased for those who began employment in each of the categorized post-World War II periods, and the coefficients are especially high for those who initiated employment in the 1966-70 period.

Educational attainment does little to increase the probability of prior on-the-job training. However, there are significant increases in the probability of prior institutional training for those who completed 10-14 years of schooling as compared with those who dropped out of school prior to their 10th year. Similar

TABLE V-9

DETERMINANTS OF THE PROBABILITY OF HAVING TRAINING PRIOR TO EMPLOYMENT AT THE GISHOLT MACHINE COMPANY BY TYPE OF TRAINING

Variable	Regression Coefficient and Standard Error		
	OJT versus None[a]	Institutional versus None[b]	OJT + Institutional versus None
Age at time of first Gisholt job[c]			
under 17	-.157 (.130)[d]	-.213 (.108)*	-.198 (.100)*
18 - 20	-.192 (.074)**	-.168 (.057)**	-.178 (.054)**
26 - 30	.148 (.076)*	.062 (.061)	.083 (.055)
over 30	.060 (.069)	.046 (.054)	.028 (.049)
Year started with company[e]			
1940 - 1945	-.056 (.122)	.032 (.117)	.003 (.102)
1946 - 1950	.162 (.180)	.427 (.143)**	.317 (.128)**
1951 - 1955	.147 (.126)	.363 (.116)**	.247 (.101)**
1956 - 1960	.186 (.127)	.284 (.120)**	.226 (.104)*
1961 - 1965	.172 (.111)	.357 (.106)**	.270 (.091)**
1966 - 1970	.244 (.111)*	.401 (.105)**	.307 (.091)**
Educational attainment[f]			
10 - 11	.064 (.086)	.162 (.077)*	.101 (.067)
12	.132 (.075)	.284 (.068)**	.183 (.058)**
13 - 14	-.019 (.127)	.238 (.099)*	.118 (.090)
15 - 16	.004 (.168)	.093 (.141)	-.004 (.131)

TABLE V-9 (continued)

Variable	Regression Coefficient and Standard Error		
	OJT versus None	Institutional versus None	OJT + Institutional versus None
Occupational level of first Gisholt job[g]			
Skilled	.142 (.073)*	.211 (.062)**	.158 (.055)**
Semiskilled	.014 (.072)	.112 (.062)	.067 (.055)
Clerical	.014 (.116)	.146 (.093)	.098 (.084)
Size of city of birth[h]	.001 (.065)	.006 (.052)	-.002 (.008)
Born in Wisconsin (1,0)	-.013 (.011)	.004 (.009)	.010 (.147)
Constant	.217 (.143)	-.065 (.132)	.223 (.116)*
R	.32**	.40**	.33**
S.E.E.	.48	.45	.45
N[i]	396	546	639

[a]On-the-job training (OJT) is defined as experience in similar occupational duties as on first Gisholt job where this prior employer trained the worker.

[b]Institutional training consists of experience in any of the following types of training: high school voc. ed.; post-high school voc. college; other forms of institutional training; and occupational training while in the armed forces.

[c]Referenced to persons 21-25 years old.

[d]Standard errors appear in parentheses.

[e]Referenced to persons who started before 1940.

[f]Referenced to persons who completed less than tenth grade.

[g]Referenced to persons with unskilled jobs.

[h]City size is coded as in fn. e, Table V-7, p. 118 supra.

[i]20 observations have been omitted due to nonascertained information.

*Significant at the .05 level.

**Significant at the .01 level.

results are found for the combined on-the-job and institutional training, but the increased probability of such prior training is statistically significant (at the .01 level) only for those who completed high school.

It is seen, then, that a later starting age (beyond 21), a later starting year (after World War II, and especially in the 1960s), and higher educational attainment (especially high school graduates compared with dropouts) increased the probability that employees would have had training prior to their employment at Gisholt. The increased probabilities are especially significant with regard to institutional training as compared with on-the-job training.

3. Preparation for the Highest-Paying Job at the Gisholt Company

Since there was considerable in-plant mobility and upgrading of Gisholt employees, the first jobs they held at the company were by no means in the same occupational category as their highest-paying jobs. In the preceding section, the previous training and experience of Gisholt employees were related to the occupation of their first jobs with the company. In this section, their pre-Gisholt training and experience is related to the occupation of their highest-paying jobs at Gisholt. In Table V-10, craftsmen, operatives, clerical, and unskilled employees on their highest-paying Gisholt job are compared for the eight types of pre-Gisholt training and experience utilized in Table V-1. The format is similar to that of Table V-1 which related these eight paths of skill development to the occupational level of the employees' first jobs at Gisholt. Since apprenticeship is not relevant for the employees' highest-paying job, this occupational category is omitted. Since Table V-10 is meant to reflect the significance of upgrading, it includes only those employees who reported a job change while working at the Gisholt Company.

As compared with their preparation for their first jobs at Gisholt, formal vocational education played a smaller role for skilled craftsmen and a larger role for semiskilled operatives in the preparation for their highest-paying jobs. Less

TABLE V-10

PRE-GISHOLT PREPARATION FOR HIGHEST-PAYING GISHOLT JOB BY OCCUPATION[a]

Pre-Gisholt Training and Related Employment Experience	Highest-Paying Gisholt Occupation[b]			
	Skilled Craftsmen	Semiskilled Operatives	Clerical	Unskilled Labor
1. Vocational or technical education taken in high school	25.3%[c]	38.2%	14.3%	5.0%
2. Vocational or technical education taken in post-high school technical school	13.1	16.0	7.1	10.0
3. Apprenticeship	--	2.5	--	5.0
4. Government retraining	3.6	--	--	5.0
5. Correspondence courses	4.0	4.9	7.1	--
6. Vocational education while in the armed forces	20.8	26.0	27.3	15.0
7. Prior employment in this or related occupation	33.0	17.9	--	100.0
8. Employer provided training in the employment experience represented in #7	2.5	1.6	--	--
Total number with job change to reach their highest-paying position	221	123	14	20

[a]Table includes only those employees reporting a job change while working for Gisholt.

[b]These distributions may not be an accurate reflection of the number of persons changing jobs due to the presence of a large number of incomplete and inaccurate responses. Missing data were most severe in the case of persons starting as laborers. We know that 63 of the 100 persons starting at this level changed jobs during their Gisholt employment; yet data on the pre-Gisholt employment and training were complete for only 20 such persons.

[c]Percentages do not add to 100 since categories are not mutually exclusive and some employees reported no training or related experience.

than 40 percent of those who were craftsmen on their highest-paying jobs reported that they had taken vocational or technical courses in high school or post-high school institutions. Fifty-four percent of those who moved to semiskilled jobs had taken formal vocational courses as compared with 40 percent of those who held semiskilled jobs when they first entered the plant.

A relatively small number of the clerical employees and unskilled workers reported a job change while working for Gisholt. Of those who moved into these occupational categories on their highest-paying Gisholt jobs, only 20.4 percent of the clerical workers and 15 percent of the unskilled laborers reported that they had taken formal vocational courses prior to their Gisholt employment. These proportions with formal vocational training were substantially below those with such training who took clerical and unskilled jobs when they first began their employment at the Gisholt Company.

As in the case of the preparation for first jobs at Gisholt, vocational education and training in the armed forces were relatively important in the prior preparation of those who changed jobs at Gisholt The proportions with armed forces training ranged from 15 percent of those whose highest-paying job was unskilled labor to 27.3 percent for those whose highest-paying job was in clerical employment. On the other hand, it is notable that none of those who moved into a highest-paying skilled job reported that they had taken an apprenticeship prior to Gisholt. Those who had taken a prior apprenticeship in preparation for their first skilled jobs at Gisholt tended to remain in those skilled jobs and were not included among the job changes in Table V-10.

Pre-Gisholt employment in the same or a related occupation was reported by one-third of those who moved into highest-paying skilled jobs and by all of those whose highest-paying Gisholt job was in the unskilled labor category. However, less than 18 percent of the semiskilled operatives and none of the clerical

employees who moved into these occupational categories on their highest-paying jobs reported that they had had prior employment in the same or a related occupation before joining the Gisholt Company.

Prior Preparation for Highest-Paying Skilled and Semiskilled Jobs

Appendix Tables E1 and 2 present comparisons of pre-Gisholt training and experience for specific skilled occupations and specific semiskilled occupations of employees who moved to these occupations on their highest-paying jobs in the Gisholt Company. These comparisons are equivalent to those presented in Tables V-3 and V-4 for employees' first jobs at the Gisholt plant. Relatively large percentages of those whose highest-paying jobs were tool-and-die makers, machinists, and foremen reported that they had had previous vocational courses in high school or post-high school institutions as well as experience in similar work prior to their employment at Gisholt. As in the case of the first jobs at Gisholt, mold makers on their highest-paying jobs had had relatively less formal vocational school training. Although inspectors had taken vocational courses in high school and in the armed forces, they reported little other institutional-type training; 60 percent said that prior experience in a related occupation served as preparation for their highest-paying Gisholt jobs.

When machine operators on their highest-paying jobs are compared with machine operators on their first jobs at Gisholt, a larger proportion (almost 58 percent) reported formal vocational education, and a smaller proportion (17.2 percent) reported prior experience in a related occupation. Although more than half of those who moved to machine assembler occupations in their highest-paying Gisholt jobs had had prior high school vocational education, none indicated that he had taken post-high school vocational courses (Appendix Table 2). More than one-third of the machine assemblers on their first jobs reported prior employment experience as compared with only 17.3 percent of those who moved to machine assembly for their highest-paying Gisholt occupation.

Thus, there are no consistent changes in the relative importance of prior institutional training and on-the-job experience when we consider those who put certain occupations as their first jobs at Gisholt and those who moved to these occupations as their highest-paying jobs in the company. Vocational training in the armed forces was relatively important for both groups, as were other forms of institutional training for both groups of skilled craftsmen. Other forms of institutional training increased in importance for semiskilled operatives and decreased in importance for clerical and unskilled employees on their highest-paying jobs, as compared with those in the same occupational categories on their first jobs with the company. Prior employment experience was relatively less important for the craftsmen, operatives, and clerical employees on their highest-paying jobs and more important for unskilled labor as compared with those in these occupations on their first jobs in the company. There is little consistency in the changes for specific skilled and semiskilled occupations.

It is reasonable to assume that the training and experience of employees after they began work at Gisholt played a more important role in their advancement to higher-paying jobs than their pre-Gisholt training and employment experience.

4. Training and Experience on the First Jobs at Gisholt

Even though the skilled craftsmen had greater investments in training and experience prior to their Gisholt employment than did the other occupational groups, they continued to aggregate more hours of training than the other groups on their first jobs with the company. However, as noted in Table V-11, there are interesting differences between the occupational groups according to the type of training received and the training and experience they had before coming to the Gisholt Company.

Among the relatively large number in each occupational group who reported that they had had vocational training in high school, the semiskilled, clerical, and unskilled workers reported more hours of on-the-job training in their first

TABLE V-11

MEAN AMOUNT (HOURS) AND TYPE OF TRAINING RECEIVED ON FIRST GISHOLT JOB, BY PRIOR VOCATIONAL TRAINING OR RELATED EMPLOYMENT EXPERIENCE AND OCCUPATION OF FIRST GISHOLT JOB

Type of Pre-Gisholt Vocational Training or Related Employment Experience and Method of Training on First Gisholt Job	Mean Amount of Training (Hours) for Persons Entering Gisholt at Occupation:				
	Skilled	Apprentices	Operatives	Clerical	Laborers
1. High school voc. ed.					
OJT[a]	120.7	--	171.2	161.2	164.6
Classroom[b]	24.0	--	24.0	--	--
OJT & classroom[c]	136.0	--	135.8	--	--
2. Post-high school voc. ed.					
OJT	94.2	--	128.4	85.8	--
Classroom	171.0	--	276.3	--	--
OJT & classroom	314.0	1146.8	161.4	--	--
3. Apprenticeship					
OJT	123.0	--	42.7	8.0	40.0
Classroom	--	--	--	--	--
OJT & classroom	492.0	2471.3	--	--	--
4. Government retraining					
OJT	--	--	87.8	144.2	--
Classroom	--	--	--	--	--
OJT & classroom	--	--	--	--	--
5. Correspondence					
OJT	32.0	--	143.9	140.5	--
Classroom	--	--	318.0	--	--
OJT & classroom	--	--	--	--	--
6. Armed forces					
OJT	168.1	--	124.2	31.7	318.0
Classroom	--	--	372.0	--	--
OJT & classroom	--	3651.3	145.7	--	--
7. Prior employment experience					
OJT	152.3	--	152.2	145.5	--
Classroom	24.0	--	--	--	--
OJT & classroom	492.0	--	101.3	--	--
8. Prior employment & training					
OJT	17.3	--	87.9	16.1	--
Classroom	--	--	--	--	--
OJT & classroom	--	--	--	--	--

[a]OJT represents formal training received on the job under the supervision and tutelage of a foreman, instructor, or fellow worker. Includes those who took only OJT.

[b]Classroom instruction takes place off-the-job, and during working hours, but workers may not necessarily receives wages. Includes those who took only classroom instruction.

[c]"OJT and classroom" indicates that a combination of both training techniques was used. It should not be assumed, however, that instruction in both settings was coordinated. The three categories of training are mutually exclusive.

jobs than did the skilled craftsmen. Semiskilled operatives who had taken post-high school vocational courses also reported more on-the-job training in their first jobs than did the skilled craftsmen. Semiskilled operatives also received more hours of classroom instruction in their first job as compared with the craftsmen who had taken formal vocational courses at the post-high school level. Whereas the operatives averaged over 276 hours of classroom instruction, the skilled craftsmen averaged only 171 hours in the classroom while on their first jobs at the company. Classroom instruction was also important for the semiskilled operatives who had taken other types of institutional training such as that received in the armed forces or through correspondence courses. The skilled craftsmen who had taken institutional training of this type received no classroom instruction on their first jobs at Gisholt. As noted in Table V-11, clerical employees and laborers received no classroom instruction on their first jobs at Gisholt regardless of the training and experience paths followed prior to their employment with the company.

It was the combination of on-the-job training and classroom instruction which dominated the training experience of the skilled craftsmen and apprentices on their first Gisholt jobs. This combination was also important in the training of semi-skilled operatives. Skilled craftsmen who had previously taken post-high school vocational courses reported an average of 314 hours of combined on-the-job and classroom training at Gisholt, and those who had previously taken apprenticeship training reported 492 hours of the combined training on their first jobs at Gisholt. A similar high average of combined training on the first jobs was reported by the craftsmen who had prior employment experience in a related occupation.*

As might be expected from the nature of apprenticeship training, the largest number of hours of combined on-the-job training and classroom instruction was reported by the five employees who began work at Gisholt as apprentices. The average ranged from 1,146 hours for those who had received previous post-high school

*See description of Machinist Apprentice Program in Appendix F.

vocational training to 3,651 hours for those who had received vocational training in the armed forces. Although combined on-the-job and classroom training was not as important for semiskilled operatives on their first jobs as it was for the craftsmen and apprentices, nor as important overall as other types of training that they received at Gisholt, nonetheless the combined on-the-job+classroom training received by the operatives on their first Gisholt jobs averaged 135.8 hours for those with previous high school vocational training, 161.4 hours for those with previous post-high school vocational training, 145.7 hours for those with previous armed forces vocational training, and 101.3 hours for those with prior employment in a job related to their first occupation in the company.

On-the-job training, without separate or related classroom instruction, was commonly used for all occupational groups on their first Gisholt jobs. For clerical employees and laborers, it was the only form of training utilized, regardless of their previous training and experience before taking Gisholt employment. The number of hours of on-the-job training received by clerical employees on their first jobs with the company ranged from an average of eight hours for those who had previous apprenticeship training and 16.1 hours for those who had previous on-the-job training to 161 hours of on-the-job training for those who reported previous high school vocational education. Laborers with previous high school vocational training averaged 164.6 hours of on-the-job training on their first Gisholt jobs, previous apprentices averaged 40 hours, and those with previous vocational training in the armed forces averaged 318 hours. Laborers with other previous training experience reported no on-the-job training on their first Gisholt jobs. Unlike the other occupational groups, the semiskilled operatives consistently reported a relatively high average number of hours of on-the-job training on their first company jobs regardless of their previous training or experience. In addition to on-the-job training at Gisholt for those who had previous institutional training, the

operatives who indicated prior employment experience in a related occupation averaged 152 hours of on-the-job training and those who received on-the-job training before joining Gisholt averaged 87.9 hours of on-the-job training on their first Gisholt jobs.

As noted in preceding chapters, an effort was made to distinguish on-the-job training from the simple process of learning through experience on the job. The questionnaire directed to employees (see Appendix A) asked them to distinguish carefully between instruction by supervisors and by fellow workers and skills acquired simply by watching fellow workers and asking occasional questions. On-the-job training, as defined in the analysis of Table V-11, is training of a worker on the job by a supervisor, instructor, or fellow worker as contrasted with a worker's acquiring skill through experience, observation, and the possible use of occasional questions.

Regression Analysis

Separate regression analyses for craftsmen, operatives, clerical workers, and laborers were used to determine the factors associated with variants in the hours of training acquired on their first jobs at Gisholt. The results are presented in Table V-12.

The independent variables are:

1. Age at time of entry, measured in years as a continuous variable.

2. Educational attainment, measured in years as a continuous variable.

3. Year of entry, measured as a continuous variable from 1 to 50, corresponding to the years 1920-70.

4. Pre-Gisholt training and experience, represented by five dichotomous variables which are not mutually exclusive. The subvariables correspond to the types of institutional training used in earlier analyses. "Other" includes correspondence school courses, government retraining programs, and apprenticeship.

TABLE V-12

DETERMINANTS OF THE HOURS OF TRAINING ON THE FIRST GISHOLT JOB, BY OCCUPATIONAL GROUP

Variable	Regression Coefficients and Standard Errors[a]			
	Skilled Craftsmen[b]	Semiskilled Operatives	Clerical Workers	Unskilled Laborers
1. Age at time of entry (years)	-30.7 (36.44)	-19.8 (39.3)	23.2 (89.6)	-15.1 (20.7)
2. Educational attainment (years)	-5.7 (3.5)+	-10.7 (40.3)	-31.5 (74.2)	-29.3 (16.6)+
3. Year of entry[c]	4.3 (7.0)**	4.8 (2.8)+	-7.0 (2.2)**	1.9 (2.0)
4. Pre-Gisholt training experience[d]				
a. High school vocational education (1,0)	-25.8 (26.7)+	18.4 (24.5)	71.4 (68.8)	-50.3 (55.1)
b. Post-high school vocational education (1,0)	16.5 (27.9)	-4.8 (37.2)	-63.3 (74.1)	-28.3 (83.1)
c. Other (1,0)	-9.9 (31.6)	-66.3 (37.2)+	-144.5 (144.8)	-170.3 (61.9)**
d. Armed forces training (1,0)	-2.8 (24.9)	28.6 (29.3)	-46.7 (82.7)	-13.1 (55.8)
5. Pre-Gisholt experience in a related occupation (1,0)	-45.9 (23.4)+	7.1 (26.3)	100.1 (78.2)	-52.2 (44.0)
6. Length of potential job experience (years)[e]	-15.4 (7.1)*	-23.4 (9.6)**	21.4 (56.2)	18.8 (18.3)
7. Method of training at Gisholt[f]				
a. OJT	56.6 (21.3)*	63.3 (22.9)*	53.4 (45.7)	33.5 (40.7)
b. Classroom	12.5 (11.8)	6.5 (18.9)	I.O.R.	I.O.R.
c. OJT + classroom	98.9 (53.1)*	121.8 (64.1)*	I.O.R.	I.O.R.
Constant	17.4 (42.5)**	224.3 (45.4)**	115.3 (197.8)	108.0 (52.7)

TABLE V-12 (continued)

Variable	Skilled Craftsmen	Semiskilled Operatives	Clerical Workers	Unskilled Laborers
$\bar{X}$	219	164	132	131
R^2	.13	.14	.26	.23
S.E.E.	147.3	151.8	173.7	161.4
F Ratio	1.73	2.07	.74	1.42
N	237	253	44	100

[a]Standard errors appear in parentheses.

[b]Excludes a small number of workers claiming formal apprenticeship training.

[c]An index variable going from 1 to 50, corresponding to years 1920-70.

[d]Pre-Gisholt training variables not mutually exclusive.

[e]Defined as [(age at time of entrance)—(years of school)-6].

[f]Referenced to learning by doing (LBD). Categories are mutually exclusive.

$\bar{X}$ = Mean of dependent variable.

R^2 = Coefficient of determination.

S.E.E. = Standard error of estimate.

N = Number of observations.

I.O.R. = Insufficient observations for regression.

\+ = Significant at the .10 level.

* = Significant at the .05 level.

** = Significant at the .01 level.

The coefficient in each case represents the number of training hours on the Gisholt job which is associated with previous enrollment in the specified type of institutional training as compared with nonenrollment in that specified type of institutional training.

5. Pre-Gisholt experience in a related occupation, a dichotomous variable.

6. Length of potential job experience, a continuous variable measured in years, defined as (age at time of entrance to Gisholt)-(years of school)-(6).

7. Method of training on the first job at Gisholt, three mutually exclusive categories of company training--on-the-job, classroom, and on-the-job plus classroom--referenced to "learning by doing."

Skilled Craftsmen. Age at time of entry is not a statistically significant variable in explaining the hours of training at Gisholt for skilled craftsmen or for any of the other occupational groups. However, the sign of the coefficient is as expected for all but the clerical group. Older workers received less training than younger workers.

Educational attainment is also negatively associated with hours of training on the first jobs for the skilled craftsmen and the other occupational groups. The relationship is significant at the .10 level for the craftsmen and laborers. The later the entry into Gisholt, the more hours of training received on the first job, with each additional year after 1920 accounting for an additional 4.3 hours of training for a skilled craftsman.

The only statistically significant (at the .10 level) pre-Gisholt training experience is high school vocational education, which reduces the number of training hours for workers on their first Gisholt jobs by 25.8 as compared to those who did not have high school vocational education. Experience in a related occupation prior to Gisholt also brings about a statistically significant reduction in training hours for skilled craftsmen on their first Gisholt jobs. The length of potential job

experience also has a statistically significant negative relationship with the hours of training on the first Gisholt job.

The methods of craftsmen training at Gisholt aslo had a significant influence on the number of hours of training. Those who had a combination of on-the-job and classroom training totaled an average of 98.9 hours of training on their first jobs; those who had only on-the-job experience averaged 56.6 hours of training on their first jobs.

Semiskilled Operatives. The statistically significant variables associated with hours of training of skilled operatives are year of entry into Gisholt, other institutional training (correspondence courses, government retraining, and/or apprenticeship), length of potential job experience prior to Gisholt, on-the-job training at Gisholt, and on-the-job plus classroom training at Gisholt. The more years of potential job experience prior to Gisholt, the less the training required on their first jobs at Gisholt, with each year of potential job experience reducing the hours of training by 23.4. As in the case of skilled craftsmen, those who had the combination of on-the-job and classroom training on their first jobs were involved in a substantially greater number of hours of training than those who had either on-the-job or classroom training alone.

Clerical Workers and Laborers. The only significant relationship with hours of training for these two groups are the negative relationship with educational attainment for laborers, the negative relationship with year of entry for clerical workers, and the negative relationship with "other institutional training" for laborers. The small numbers receiving training on their first jobs at Gisholt among clerical and unskilled workers reduce the possibilities of significant statistical relationships between the independent variables and the hours of training.

4. Conclusions

Formal institutional training was much more important than on-the-job training in developing skills of Gisholt employees prior to their employment with the company. Vocational education in high school and post-high school institutions, as well as vocational training received in the armed forces, were the most important forms of institutional training for Gisholt workers prior to their employment with the company. "Learning by doing" was also an important source of skill development for each of the skill groups.

The total prior investment in skill development was greatest for skilled craftsmen. The investment for semiskilled operatives and clerical employees was roughly similar and, in both cases, it was below the level reqported by skilled craftsmen. However, it is notable that in the case of the craftsmen only 9.3 percent reported that they had taken apprenticeship training prior to their first skilled jobs at Gisholt.

For the sample of Gisholt workers, taken as a whole, age at the time of first employment with the company, length of service with the company, educational level, and skill level are significant determinants of the probability that the employee had had some training prior to his Gisholt employment.

When a separate regression analysis is conducted for skilled craftsmen, there are interesting differences between the effects of education and year of entry into Gisholt on the probability of prior training as compared with the number of hours of training on the first Gisholt job. Whereas increased educational attainment for skilled craftsmen increases the probability of their having had prior training, it reduces the number of hours of training on their first Gisholt jobs. On the other hand, a later year of entry into Gisholt is associated with a higher probability of pre-Gisholt training as well as with an increased number of hours of training on their first Gisholt jobs.

The increased probabilities that employees will have had pre-Gisholt training associated with later starting ages, later starting years, and higher educational attainment are especially applicable to prior institutional training as compared with prior on-the-job training.

Since there are few consistent relationships between pre-Gisholt training and the skill of employees' highest-paying jobs at Gisholt, it is reasonable to assume that the training and experience of employees after they began work at Gisholt played a more important role in their advancement to higher-paying jobs than their pre-Gisholt training and employment experience.

The combination of on-the-job and classroom instruction was the predominant experience of the skilled craftsmen and apprentices, and to a lesser extent of the semiskilled operatives, on their first Gisholt jobs. However, for clerical employees and laborers, on-the-job training without separate or related classroom instruction was the only form of training utilized at Gisholt, regardless of their previous training and experience before taking Gisholt employment. For skilled craftsmen and semiskilled operatives, combined on-the-job and classroom training resulted in a significantly larger number of total hours of training on the first Gisholt jobs than was the case for those who took on-the-job or classroom training separately. Except for the unskilled laborers, the year of entry into the Gisholt plant was significantly related to the number of hours of training on the first Gisholt job. However, in the case of skilled craftsmen and semiskilled operatives, the relationship was positive, with each year of entry after 1920 adding 4.3 and 4.8 hours of first-job training, respectively; in the case of clerical workers the relationship was negative, with a reduction of 7 hours of first-job training for every later year of entry into the plant.

It would seem reasonable to conclude that the Gisholt Company assumed increasing responsibility for the training of craftsmen and semiskilled operatives in

the later years of its existence. Clerical employees appear to have received greater amounts of training in schools and other institutions in the later years, and consequently their training by the company decreased.

The analyses in this chapter confirm the view that workers can arrive at the same occupational skill status through a variety of paths, ranging from formal vocational education to informal "learning by doing." The various paths may be used in combination or in isolation, and a company such as Gisholt can benefit from the skills acquired by its workers through a variety of public and private sources before they become company employees.

In spite of the benefits derived from prior skill acquisition, Gisholt employees continued to receive many hours of training on their first jobs with the company. To some extent, previous training and education served to reduce the need for training. Years of potential employment elsewhere was significantly associated with a reduction in training hours at Gisholt. However, the company's training policy was not static. The year of entry into Gisholt was also significantly related to the amount of training on the first job.

CHAPTER VI

SELECTED BENEFITS OF COMPANY-SPONSORED TRAINING

In this chapter selected benefits of company-sponsored training are estimated by relating various methods of skill acquisition to employee earnings, the time needed to reach competence on the job, and upward mobility. The analysis focuses on benefits that accrue to employees and an employer while workers remain with the company. The contribution of company-provided training to the subsequent labor market activity of workers, an additional benefit of company-sponsored training, is more appropriately discussed in Chapter VIII, dealing with the post-shutdown experience of Gisholt's work force.

1. Effects of Training on Earnings

The first section explores the relationship between worker earnings and company-sponsored training (1) by estimating the effects of formal training on first job earnings, and (2) by estimating the cumulative effect of all company-provided instruction upon the highest earnings of workers while employed with the company.

First Job Effects

While the earnings effects of training in the external labor market are well documented, it may be incorrect to assume that a similar relationship exists in the internal labor market of an individual firm. Following are some reasons why wages (earnings) on an initial job may not vary positively with company-sponsored training:

1. If, as argued, firms provide formal training in part to compensate for the skill or knowledge differences among new hires, then to the extent that training is successful, these differences will diminish.

2. Within a highly structured labor market, wages are not usually sensitive to the short-run changes in worker quality per se. Increases in hourly wage rates

usually are associated with length of service, which may or may not reflect productivity increases on the job. This situation obtains especially when the internal labor market is partially regulated by a union contract.

3. Similarly, within a manufacturing firm, wage rates per se may be an inadequate measure of individual worth, since changes in productivity are more accurately reflected through incentive payments. From a previous chapter, it is recalled that Gisholt abandoned an incentive wage system during the late 1950s and substituted a wage system that averaged or pooled worker productivity.

4. An employer may use different methods of training for different types of jobs. It can be argued that jobs requiring company-specific training are by definition more germane to one employer than are other jobs requiring general instruction. It also seems reasonable to suggest that company-specific jobs may be associated with on-the-job training and lower pay rates, while transferable occupations require classroom instruction, with less on-the-job training, and are higher paying jobs as well. Thus, a simple relationship between some measure of earnings and training may reflect the composition of jobs and the characteristics of training methods, even within narrow occupational categories.

5. Finally, a company's wage structure at any time reflects the impact of tradition and of historic personnel practices.

For these reasons, it is likely that worker training on an initial company job would not have a significant earnings effect, especially in this study of one firm's internal labor market. In the final analysis, however, this remains an empirical question, subject to examination using data provided by all surveyed employees.

The dependent variable in this analysis is E--average post-training, before-tax weekly earnings on the first company job, adjusted for growth in money wages over time. Weekly earnings is a more suitable dependent variable than hourly wage rates, since wage rates do not reflect incentive pay. In order to make the earnings

data compatible and correct for time in the analysis, E is weighted by an index of weekly earnings for production workers in the State of Wisconsin.[1]

Factors Influencing First Job Earnings--On theoretical and intuitive grounds, it is possible to specify factors that explain variations in average weekly earnings for first jobs with the company. As a starting point, variations in E are hypothesized to be a function of the demographic characteristics of workers (D), the stock of worker skills prior to Gisholt employment (S), the year of entrance (Y), and the method of worker preparation used by Gisholt (M). The relationship takes the general form of

$$E_{ik} = f(D, S, Y, M) + u_{ik}$$

where i is the first job with the company, k is the general occupational group of the job i, and u is the error term.

Variables representing demographic factors (D) are included in the model to account for individual differences in earnings. We are able to measure such individual differences as age, sex, marital status, race, and place of birth. Of these variables, race and sex display almost no variance in the population of production force workers (i.e., about 1 percent). Both marital status and alternative measures based on the place of birth, for example, city size, state identification, or region of birthplace, display highly skewed distributions. Correlations between these demographic factors and the dependent variable are extremely small, and their inclusion in the regression containing other factors neither significantly increases predictability nor significantly alters the regression coefficients for other non-demographic variables. For these reasons, marital status and place of birth are omitted from the analysis. The remaining demographic factors, age (D_a) and educational attainment (D_{ed}), are included in the model as control variables, but the coefficients for both may also be enlightening.

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[1] An index of average earnings for production workers in manufacturing in Wisconsin. See U.S. Bureau of Labor Statistics, Handbook of Labor Statistics, Table 105, pp. 213-214.

Due to the study design, we are unable to measure perhaps the most important of all individual qualities--individual ability. Most labor market studies suffer from a similar handicap, but the theoretical linkage between ability and earnings suggests that this omission might be even more significant in our research. As reported, workers were selected by the company on the basis of prior experience and mechanical aptitude or ability, with ability serving as a substitute for experience, especially for recent school leavers.

A previous chapter has described the impressive amount of pre-Gisholt training and related employment experience displayed by workers in the sample, noted in our model as S--the stock of worker skills prior to employment. Our discussions with company officials suggest that the following pre-Gisholt institutional training programs affect E:

1. Vocational education or technical instruction while in high school (S_{hs}).

2. Post-secondary vocational or technical instruction in a vocational school, technical institute, or junior college (S_{ps}).

3. Vocational education while in the armed forces (S_{af}).

4. Other types of vocational training, including apprenticeship training programs, correspondence courses, and government-sponsored retraining programs (S_o).[2]

Each of these variables--S_{hs}, S_{ps}, S_{af}, and S_o--measures the simple incidence of worker participation in a type of training program during the pre-Gisholt period and is entered in the equation as a dummy variable coded as either 1 or 0. Each variable should display a positive sign in the regression equation; however, the magnitude of their corresponding coefficients cannot be ranked on an a priori basis.

Perhaps a more appropriate method of measuring pre-Gisholt participation in vocational training programs would be to assess the relevancy of each training

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[2] We recognize that this variable, S_o, constitutes a potpourri compared to other variables in the equation. However, the extremely small number of workers reporting pre-Gisholt participation in formal apprenticeship programs, correspondence courses, or government-sponsored retraining programs requires that one residual category, representing all such programs, be used.

experience to the duties and responsibilities of the first Gisholt job. Recognizing the merits of this approach, we examined alternative measures of training program relevancy. For instance, workers were asked: "Did this training program help you get your first job with [Gisholt]?" or "How helpful was this training to performing your first job at Gisholt?" A second measure compared the occupational aim of pre-Gisholt training programs with the occupational duties and responsibilities on the first Gisholt job. However, both approaches suffered from serious shortcomings, including the relatively poor performance of these variables in the regression equations. Since so little is known about the transferability and relevancy of training, we are compelled to accept the simple incidence of worker participation in training programs as a somewhat imperfect measure.

Aside from specific institutional training programs, workers can improve their occupational knowledge and skill through employment experiences. Intuitively, such experiences can be viewed as composed of occupational and industrial effects, and there may be interaction between the two. Unfortunately, the number of workers claiming prior industrial experience in a related industry (e.g., jobs in the machine tool building industry or related durable goods manufacturing) is small. Pre-Gisholt experience in a related occupation, on the other hand, is well represented in the sample. The analysis of E, therefore, includes variable S_{oc} in order to measure the importance of worker experience in a related occupation before joining the company.

The problem, once again, is to determine what constitutes related occupational experience. For purposes of this study, a pre-Gisholt job is judged to be related to the first Gisholt job if (1) the two jobs fall within the same two-digit division classification of the Dictionary of Occupational Titles (DOT),[3] and (2) both jobs require a comparable degree of skill and knowledge, that is, classified

[3]U. S. Department of Labor, Manpower Administration, Dictionary of Occupational Titles, 1965 (Washington: U.S. Government Printing Office, 1965).

as either highly skilled, semiskilled, or unskilled. A positive relationship between prior occupational experience and E is expected.

Also included in the analysis is a summary experience variable, potential time eligible for employment before joining the Gisholt Company (S_{te}). This variable is calculated by subtracting the total number of years in school plus six from the age of the worker. Without specific restrictions, this variable should pick up the effects of relevant occupational and industrial experience as well as the general effects associated with all work experience. A positive relationship between this variable and E is anticipated.

Although E is adjusted to reflect a secular growth in real wages, time (Y) still plays an important role in the analysis. For example, by including a specific control for time, constant growth in the amount of training provided workers can be controlled.

Finally, the method used to train employees at Gisholt (M) is included in the model. Three such methods are distinguished: (1) Learning a job through actual job performance without specific formal instruction--commonly called "learning by doing" (M_{lbd});[4] (2) formal occupational instruction given on the job (M_{ojt}); and (3) formal on-the-job instruction supplemented by classroom training ($M_{ojt+cls}$).[5] In the equation below these variables are referenced to M_{lbd}.

Assuming linear relationships,[6] the estimating equation is

$$E_{ik} = C + b_1 D_a + b_2 D_{ed} + b_3 S_{hs} + b_4 S_{ps} + b_5 S_{af} + b_6 S_{oc}$$

$$+ b_7 S_p + b_8 S_{te} + b_9 Y + b_{10} M_{ojt} + b_{11} M_{ojt+cls} + U_{ik}.$$

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[4]Consistent with our previous definition, M_{lbd} is an informal method of skill acquisition. Workers start on the job without instruction from either a fellow worker or a supervisor. In the firm under investigation, the lbd method of job preparation was almost always associated with workers starting at an intermediate or top wage rate for the job.

[5]A small number of persons participating in apprenticeship instruction necessitates combining apprentices with other craftsmen who received classroom instruction but who were not classified as apprentices.

[6]Alternative models were tested in which dependent variables were allowed to take nonlinear forms. By and large, the straight linear model produced the best fit on this dependent variable.

Regression Results--Table VI-1 reports the regression results when E is regressed on the 11 specified regressors for each of four major occupational groups--skilled craftsmen, semiskilled operatives, clerical workers, and unskilled laborers. In terms of overall performance, the model explains larger portions of the variance in E for workers initially employed in skilled and semiskilled occupations. The coefficients of determination (R^2's) for craftsmen and operatives are .53 and .66, respectively, while the comparable statistic for clerical employees is .35; for laborers it is .22. Moreover, in the craftsmen and operative equations this statistic is highly significant at the .01 level of analysis.

From an examination of the coefficients for pre-Gisholt training and employment experience variables (S), it is evident that such variables have only a selected impact on E. Based on the magnitude of coefficients for variables designated as S and their corresponding significance levels, the effects of prior experience and training on E are greater than zero only in the case of workers joining the company as skilled craftsmen or operatives. Of the S variables included in the equation for craftsmen, S_o (other forms of vocational training) appears to have the largest impact on E--$19.97. As a residual category, S_o includes a large number of workers reporting pre-Gisholt apprenticeship programs relative to the number of workers reporting other types of vocational instruction, including correspondence school courses and government retraining programs.

But, at the same time, there are indications in the craftsmen equation that the positive impact of prior apprenticeship training on first job earnings can be equalled through a proper combination of alternative skill developing experiences. For instance, pos-high school vocational education displays a rather large and significant contribution to E--$14.40. In addition, a one-year increase in work experience represented by the variable total time eligible for employment before joining the Gisholt Company (S_{te}) augments average weekly earnings by $1.13. Thus, a graduate of a post-high school vocational program, aided by a few years of actual

TABLE VI-1

REGRESSION ANALYSIS OF ADJUSTED WEEKLY EARNINGS[a] ON FIRST GISHOLT JOB, BY OCCUPATIONAL GROUP

Variable		Regression Coefficients and Standard Errors[b]			
Symbol	Definition	Skilled Craftsmen[c]	Semiskilled Operatives	Clerical Workers	Laborers
D	Demographic factors:				
D_a	Age at time of entry (years)	.43 (.42)	.40 (.68)	.99 (.97)	-1.17 (1.09)
D_{ed}	Educational attainment years)	2.16 (.96)*	1.04 (.62)+	1.53 (.72)*	1.83 (1.57)
Y	Year of entry[d]	2.45 (1.35)*	3.00 (1.18)*	2.07 (1.26)+	2.26 (1.12)*
S	Pre-Gisholt training and related employment experience[e]				
S_{hs}	high school vocational education (1,0)	1.07 (7.20)	.30 (2.10)	1.64 (2.61)	5.53 (7.63)
S_{ps}	post-high school vocational education (1,0)	14.40 (8.40)+	8.16 (6.20)	3.52 (6.15)	5.42 (10.34)
S_o	other (1,0)	19.97 (7.20)**	3.48 (6.00)	-.22 (.18)	4.07 (7.02)
S_{af}	armed forces vocational training (1,0)	10.3 (9.20)	-3.45 (3.08)	.49 (1.82)	4.24 (6.26)
S_{oc}	prior experience in a related occupation (1,0)	10.34 (9.20)	16.04 (4.59)**	.49 (1.82)	.43 (.49)
S_{te}	total time eligible for employment (years)[f]	1.13 (.55)*	1.45 (.87)+	.58 (.48)	.57 (.65)
M	Method of preparation on first job at Gisholt[g]				
M_{ojt}	on-the-job training (1,0)	-9.60 (4.80)*	-3.60 (3.16)	.61 (.95)	.85 (1.14)
$M_{ojt+cls}$	on-the-job training plus classroom training (1,0)	25.56 (10.40)*	7.21 (2.41)**	I.O.R.	I.O.R.
C	Constant	60.96 (16.12)**	85.20 (12.40)**	56.40 (77.20)	51.35 (30.94)+

TABLE VI-1 (continued)

	Skilled Craftsmen	Semiskilled Operatives	Clerical Workers	Laborers
$\bar{X}$	118.17	118.42	97.42	110.69
R^2	.53	.63	.35	.22
S.E.E.	26.63	66.00	59.76	43.83
F Ratio	14.10**	22.79	.85	1.42
N	237	253	44	100

[a]Average weekly earnings after training weighted by an index of average earnings for production workers in manufacturing in Wisconsin in order to correct for changing time periods. See Bureau of Labor Statistics, Handbook of Labor Statistics, Table 105, pp. 213-214.

[b]Standard errors appear in parentheses.

[c]Excluding six workers claiming formal apprenticeship training.

[d]An index variable going from 1 to 50, corresponding to years 1920-70.

[e]Prior training variables not mutually exclusive.

[f]Defined as [(age at time of entrance)-(years of school)-6].

[g]Reference to workers classified as M_{1bd}; categories of this variable are mutually exclusive and coefficients represent deviations from the reference variable mean.

$\bar{X}$ = Mean of dependent variable.

R^2 = Coefficient of determination.

S.E.E. = Standard error of estimation.

N = Number of observations.

+ = Significant at the .10 level.

* = Significant at the .05 level.

** = Significant at the .01 level.

I.O.R. = Insufficient observations for regression.

experience, can earn as much as a former apprentice, holding other things constant, of course.

Pre-Gisholt training and related employment experiences are also important to workers entering at the semiskilled operative level. Unlike craftsmen, operatives appear to benefit considerably from experience in related jobs. Workers in this occupational group who have prior occupational experience earn $16.04 a week more than those who do not. This result is significant at the .01 level. While we are unable to measure the total extent or amount of related occupational experience, the significant coefficient for S_{te}--total time eligible for employment--suggests that at least the duration of this experience may significantly increase earnings of workers in the operative group.

Perhaps the most startling result reported in Table VI-1 is the performance of variables representing the type of entry training received by workers from the Gisholt Company (M). At lower level entry positions, that is, clerical and laborer groups, as well as at the semiskilled level, formal on-the-job instruction has no significant effect upon E after training. The same method of preparation, however, is associated with lower levels of earnings among workers starting at skilled positions. Moreover, for craftsmen and semiskilled workers, classroom training plus on-the-job instruction results in large increases in average weekly earnings.

The explanation seems to follow from what we have already said about training in this company. First, if training, usually conducted on the job, is indeed given to compensate for deficiencies in individual productivity, then to the extent that training is successful, productivity differences between trained and untrained employees are reduced. Average differences in earnings of the trained and untrained groups, as measures of their relative productivity, will move towards zero. The significant negative sign associated with M_{ojt} for craftsmen, then, is in part an indication that on-the-job training alone cannot sufficiently compensate for

worker deficiencies usually associated with a lack of prior experience or training. Thus, as pre-Gisholt training and related employment experiences become more important in the occupational equations--that is, as S variables produce larger and more significant contributions to E--on-the-job training faces a greater burden when used as a sole method of training the relatively unprepared.

Consistent with this argument is the fact that classroom training, as a supplement to on-the-job instruction, is associated with increased earnings for craftsmen and semiskilled workers. From what we know of the company training policy for semiskilled workers, formal classroom instruction was rarely used--only in the most crucial instances, as in the case of the entry-level MDTA program. The company's logic for implementing these classroom programs for semiskilled workers was correct: ordinary on-the-job instruction could not possibly train certain marginally competent workers.

The addition of classroom instruction for skilled craftsmen makes the largest single contribution to earnings of all variables included in these equations. Since $M_{ojt+cls}$ represents participants in the company's apprenticeship program, this result is not especially surprising. But classroom instruction in combination with on-the-job training was not restricted to apprentices. As described above, classroom training was given to other craftsmen as well, usually in the form of short courses. It should be noted that the addition of classroom instruction to on-the-job training for semiskilled operatives is also associated with a significant increase in earnings for this group.[7]

As is seen in Table VI-2, the average number of hours of total training is substantially greater for registered apprentices and others who combined on-the-job and classroom training on the first jobs, as compared with those craftsmen who

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[7]An alternative explanation of these results should be acknowledged. It is conceivable that classroom instruction was given solely to higher paying occupations within the craftsmen occupational group or solely to the "best" employees who would be expected to have higher earnings in any case. However, there is no evidence from our discussions with company officials that this was the case.

TABLE VI-2

TRAINING RECEIVED BY REGISTERED APPRENTICES, OJT TRAINEES AND OJT+CLASSROOM TRAINEES IN PREPARATION FOR SKILLED CRAFTSMEN JOBS

Characteristics of Training	OJT Trainees on First Gisholt Jobs	Registered Apprentices on First Gisholt Jobs	OJT+Classroom Trainees on First Gisholt Jobs
1. Number of trainees	130	5	18
2. Average amount of training (hours)	236	2,435	492
3. Use of instructional aids (percent of trainees)			
a. Charts and graphs	--	100.0%	83.4%
b. Training manuals	9.2%	100.0	94.4
c. Movies or slide projectors	--	100.0	--
d. Demonstrations by competent workers	58.5	100.0	100.0
e. Discussions with supervisors	93.8	100.0	100.0
f. Practice sessions	--	100.0	61.1

had on-the-job training alone. This factor undoubtedly contributes to the increased earnings associated with the "OJT+classroom" variable (which includes apprentices in the regression analysis).

The total hours of training received by apprentices are appreciably greater than those received by other craftsmen, but the use of instructional aids is comparable for apprentices and other craftsmen who received combined on-the-job and classroom instruction, and is in contrast with those who received on-the-job training alone.

Earnings Effect on Highest Paying Job

From what we know of internal labor market mobility, it would be incorrect to assume that the earnings effect of formal company training is manifest solely in initial company jobs. As previously described, worker promotions and lateral

transfers were common practices in this company, resulting in the need for some additional worker training on each new job.

In ideal terms, it is desirable to estimate the added or marginal earnings effect associated with worker training received on each new position with the company. Unfortunately, such a task is beyond the scope of this research, since it requires complete access to personnel files and estimates of added training on each new job. An alternative procedure based on available data is to analyze the earnings of workers on their highest paying job with the company and to infer from this analysis the importance of all company-provided training to earnings.

The dependent variable in this analysis is E_h--average weekly earnings on a worker's highest paying Gisholt job, adjusted for growth in wages. Since we are concerned with job changes, training, and earnings, workers reporting no change in jobs while employed by Gisholt are deleted from the sample.

The model used to explain variations in E_h incorporates many of the variables used in the analysis of first job earnings as well as additional variables representing subsequent events. In general form, it is

$$E_{hk} = f(D, S', T) + u_{hk}$$

where h is the highest paying job belonging to occupation group k; u is the error term; D represents demographic factors; S' represents the stock of worker skills developed outside the Gisholt plant, including pre-Gisholt training and related employment experiences as well as worker participation in vocational training programs while employed by the company; and T is a general expression for all company-provided training and company-specific employment experience for Gisholt.

Like the previous earnings generating function, this model acknowledges the importance of demographic factors. Included as demographic variables are age at time of highest paying job ($D_a^{(h)}$), years of formal schooling (D_{ed}), and an age-squared variables ($D_a^{(h)2}$), since earnings should display diminishing returns with respect to age.

Four variables, representing worker participation in training programs are also specified in this model under the general rubric S', the stock of prior skills not associated with employment at Gisholt. These are:

S'_{hs} = high school vocational education.

S'_{ph} = post-high school vocational training in a technical school or college.

S'_{0} = other types of vocational training, including correspondence course, pre-Gisholt participation in apprenticeship training programs, and government retraining.

S'_{af} = vocational training while in the armed forces.[8]

Each of these variables is represented by a dummy variable, and a significant positive coefficient for each is anticipated. As in the analysis of first job earnings, a continuous variable S'_{te}, representing total time eligible for employment before joining the Gisholt Company, is specified in the equations below.

The remaining variables in the model measure the sources of worker skill improvements stemming directly from their employment at Gisholt. These include:

$n\ T_{m}$ = total time employed at Gisholt in log form, measured in months.

$n\ T_{ft}^{(h)}$ = total amount of formal training received on job h in log form, measured in hours.

$T_{ft}^{(i)}$ = a dummy variable signifying whether a worker was formally trained on his first job i at Gisholt.

$T_{oc}^{(ih)}$ = change in occupational group between the first job i and the highest paying job h. (This is a dummy variable coded as: $T_{oc}^{(ih)} = 1$, if job i and job h are (a) of the same two-digit DOT classification codes, and (b) of the same general level of skill requirements--unskilled, semiskilled, or skilled; and $T_{oc}^{(ih)} = 0$, if one or both of these two conditions are not met.

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[8] The reader will note a similarity between this set of variables (S') and the set of variables in the previous section designating sources of worker skills (S). While corresponding variables, e.g., S_{hs} and S'_{hs}, record worker participation in a specific type of vocational instruction, these variables are not identical. Variables designated as S are limited to vocational programs taken before joining the company; comparable variables in this analysis also include vocational programs taken by workers after joining the company.

Results--Regression results explaining variations in E_h are provided in Table VI-3. A separate equation is estimated for workers receiving their highest level of weekly earnings on craftsmen or semiskilled jobs. Employees reporting no job change between their entry level position and their highest paying position are deleted from the analysis.[9] Because so few were in the category, workers obtaining their highest weekly earnings on clerical or laborer jobs are not analyzed.

In general, the variables reported in Table VI-3 are only modest predictors of E_h for both craftsmen and operatives. The model explains 25 percent of the variation in E_h for persons reaching craftsmen level jobs and 32 percent of the variation for persons reaching the semiskilled operative level. Both results are statistically significant at the .05 level.

A number of interesting findings emerge from each equation. By and large, vocational training courses taken outside the company either before or after joining the firm are not significant predictors of higher earnings for persons reaching craftsmen level positions. However, some training programs, particularly post-high school technical training and other forms of training, do seem to contribute substantially to the earnings of workers reaching semiskilled positions. Post-high school technical training augments earnings by $8.91 per week, and programs designated as "other" in this analysis contribute $7.35 to weekly earnings. These results are statistically significant at the .05 and .10 level, respectively. Since vocational training programs in general show little impact upon first job earnings, it can be inferred from these findings that workers seem to benefit financially from private training taken while employed on a full-time basis. And,

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[9]The exclusion of workers who never changed jobs is required in order to isolate the net effects of first job training, training received on the highest paying job, and length of service with the company. It should be noted that entry training received by workers who never changed jobs may have helped them a great deal; but, since earnings tend to increase with length of service, the effects of training on earnings for nonjob-changers would be confused by their length of service.

TABLE VI-3

REGRESSION ANALYSIS OF ADJUSTED WEEKLY EARNINGS OF JOB CHANGERS ON HIGHEST PAYING COMPANY JOB BY OCCUPATIONAL GROUP[a]

Variable		Regression Coefficients and Standard Errors[b]	
Symbol	Definition	Skilled Craftsmen[c]	Semiskilled Operatives
D	Demographic factors		
D_a	Age (years)	-2.65 (.76)*	- .07 (.38)
D_a^2	Age squared (years)	.03 (.01)*	.12 (.15)
D_{ed}	Educational attainment (years)	.76 (.73)	.77 (1.16)
S'	Vocational training and related experience both prior to and during employment by Gisholt[d]		
S'_{hs}	high school vocational education (1,0)	4.17 (3.03)	1.16 (3.09)
S'_{ph}	post-high school vocational education (1,0)	- .98 (2.72)	8.91 (3.48)*
S'_o	other vocational training programs (1,0)	- .15 (1.83)	7.35 (3.87)+
S'_{af}	vocational training in armed forces (1,0)	3.41 (3.03)	-1.94 (3.09)
S'_{te}	total time eligible for employment before joining Gisholt (years)	1.13 (2.27)	-3.41 (5.02)
T	Sources of skill development while with Gisholt		
T_m	number of months with company (log)	.74 (1.14)	.77 (1.85)
$T_{oc}^{(ih)}$	similarity of first company job to highest paying company job (1 = similar, 0 = dissimilar)[e]	-4.19 (1.93)*	-2.78 (.97)
$T_{ft}^{(i)}$	method of training on first company job (1 = formal training received, 0 = no formal training received)[f]	5.10 (2.13)*	1.59 (.78)*
$T_{ft}^{(h)}$	number of hours of additional training on highest job	.27 (.12)*	.23 (.09)**

TABLE VI-3 (continued)

	Skilled Craftsmen	Semiskilled Operatives
$\bar{X}$ (dollars)	163.49	150.54
R^2	.25	.32
S.E.E.	18.35	17.65
F Ratio	3.76*	2.93*
N	213	120

[a]Excludes workers who never changed jobs while with the company. Earnings are weighted by an index of average earnings for production workers in manufacturing in Wisconsin. See Bureau of Labor Statistics, op. cit.

[b]Standard errors in parentheses.

[c]Includes graduates of apprenticeship programs.

[d]Variables are not mutually exclusive.

[e]Two jobs are judged similar if (1) they are of the same general skill level (i.e., unskilled, semiskilled, or skilled), and (2) they share common two-digit DOT code.

[f]For the purpose of this analysis, formal training includes on-the-job instruction, classroom instruction, and a combination of both on-the-job and classroom training. Workers reporting these methods of training on their first company jobs are compared to those workers receiving no formal instruction--that is, the "learning by doing" group.

$\bar{X}$ = Mean of dependent variable.

R^2 = Coefficient of determination.

S.E.E. = Standard error of estimation.

N = Number of observations.

\+ = Significant at the .10 level.

* = Significant at the .05 level.

** = Significant at the .01 level.

to the extent that higher earnings reflect higher productivity, Gisholt's decision to subsidize worker participation in such programs by extending tuition reimbursement programs to blue-collar employees was a wise one.

Perhaps the most interesting finding gleaned from Table VI-3 is that E_h is not significantly related to the duration of employment with the firm once other important factors are controlled. That is, the coefficients for the variable T_m in both equations are small and not statistically significant.

Two related explanations seem plausible. First, it is likely that the principal cause of such a relationship, namely, longevity at one job, has been negated by excluding from the analysis all workers with no reported job changes. On this score, see the differing results in Table VI-4, which includes all workers regardless of job change. Second, while higher paying jobs are allocated on the basis of seniority (which may not necessarily equal variable T_m), the effects of seniority per se on average earnings tend to be overshadowed by the effects of alternative sources of job-specific skills.[10] Judging from the significant positive relationship between additional training $T_{ft}^{(h)}$ and earnings on the highest paying job, longer experience with the company, usually involving skill development through on-the-job experience, is a poor substitute for additional training as a route to higher pay for workers.

Furthermore, there is evidence in Table VI-3 that money invested in training on the first company job, both by the employer and the employee, delivers a large positive return for persons obtaining craftsmen level status and a smaller, but still impressive, return for workers reaching semiskilled jobs. Formal training

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[10] A similar conclusion has been tentatively suggested in Frank H. Cassel, et al., "A Study of Some of the Factors That Affect Worker Mobility in Three Chicago Companies" (unpublished paper designated as "DRAFT"). Preliminary findings in this study show a meager positive contribution of seniority to individual earnings once other factors are controlled. It should be noted, though, that the surrogate for seniority used in both studies, that is, time with the company, is not a perfect substitute for actual seniority which is usually computed according to a specified formula.

on first company jobs, represented by variable $T_{ft}^{(i)}$, produces a significant coefficient (at the .05 level) for both craftsmen and operatives, equalling $5.10 and $1.59, respectively.

Finally, it is evident in Table VI-3 that workers whose first Gisholt job was in a skill classification similar to that of their highest paying position ($T_{oc}^{(ih)}=1$) tend to earn less than those workers who move to a different occupational category on their highest-paying job. Among workers reaching the craftsmen level, such skill-level changes contribute $4.19 to average weekly earnings, and among those obtaining semiskilled operative status, a skill change contributes $2.78. Both coefficients are statistically significant.

These findings present a strong argument for encouraging upgrading or promotion of workers through training, at least within the machine tool building industry. The results of this study also suggest some of the necessary conditions to make such a policy profitable for workers. First, it seems logical to encourage upgrading through training in situations where internal promotions are an important source of manpower to the firm. Some industries are a more appropriate target for this policy than others, and our research suggests that the machine tool building industry is one of them. But internal promotion and upgrading training can frequently occur in firms characterized by relatively shallow occupational hierarchies, when shortages of key workers exist. Therefore, policies should be designed which will help firms obtain these needed workers from within.

Second, in designing this policy some effort should be made to develop methods for clearing lines of promotion within the firm. That is, it may be inappropriate, and perhaps dysfunctional, to restrict our concern for upgrading simply to entry level positions. The specific job changes subsumed within the above equations took place over many years through a process of employment expansion and replacement. A policy that encourages upgrading through training in

the short run is very much dependent upon the availability of vacancies over the entire occupational ladder and upon specific channels of promotion.

Table VI-4 presents the results of a regression analysis of earnings on the highest paying jobs, similar to that presented in Table VI-3 except that the sample includes all craftsmen and operatives in the company rather than job changers alone. In addition, the analysis includes two mobility variables (lateral and vertical) and two interaction variables, relating the method of training on the first Gisholt job to lateral mobility and vertical mobility within the company.

The regression analysis for all craftsmen and operatives explains a smaller percentage of the variation in earnings than that restricted to job movers only. The significance of factors concerned with time changes when all craftsmen and operatives are included. For skilled craftsmen, age is no longer a significant variable, but longer tenure with the company is significantly associated with increased earnings. Formal training on the highest paying jobs and vertical mobility are significantly associated with increased earnings. The combination of formal training and upward mobility is associated with the largest significant increases in earnings, $9.35 per week.

As is seen in Table VI-4, regression analysis of earnings of all operatives (rather than just mobile operatives) also indicates significant increases associated with formal training on the highest paying jobs, upward mobility and the combination of formal training and upward mobility. The latter interaction variable is associated with an increase of $11.23 in the weekly earnings of semiskilled operatives (significant at the .01 level). Pre-Gisholt vocational training is also significantly associated with earnings of operatives, but length of service is not.

Thus, we see that pre-Gisholt training and training on entry-level jobs at Gisholt are not necessarily related to substantial or significant increases in

TABLE VI-4

REGRESSION ANALYSIS OF ADJUSTED WEEKLY EARNINGS OF ALL CRAFTSMEN AND OPERATIVES ON HIGHEST PAYING COMPANY JOBS++

Symbol	Variable Definition	Regression Coefficients and Standard Errors[a] Skilled Craftsmen[b]	Semiskilled Operatives
D	Demographic factors		
D_a	age (years)	1.38 (.93)	2.82 (.82)**
D_a^2	age squared (years)	- .01 (.01)	- .03 (.01)**
D_{ed}	educational attainment (years)	.98 (.87)	.61 (.78)
S'	Vocational training and related experience both prior to and during employment at Gisholt[c]		
S'_{hs}	high school vocational education (1,0)	5.39 (3.18)+	5.84 (2.80)*
S'_{ph}	post-high school vocational education (1,0)	5.39 (3.08)	4.88 (3.26)
S'_o	other vocational training programs (1,0)	-3.71 (3.32)	6.98 (3.31)*
S'_{af}	vocational training in the armed forces (1,0)	4.53 (3.15)	1.42 (3.01)
S'_{te}	total time eligible for employment before joining Gisholt (years)[d]	- .06 (.25)	- .37 (.19)+
T	Sources of skill development while with Gisholt		
T_m	number of months with company (log)	.32 (.14)*	- .21 (.24)
$T_{ft}^{(i)}$	method of training on first company job (1 = formal training received, 0 = no formal training received)[e]	-1.09 (3.93)	- .07 (3.94)
$T_{ft}^{(h)}$	method of training on highest paying company job (1 = formal training received, 0 = no formal training received)[e]	8.02 (3.89)*	3.72 (1.73)*
MO	Within plant job mobility[f]		
MO_L	lateral mobility (1 = first job (i) of same skill level as highest paying job (h)[g]	9.75 (9.23)	-4.26 (8.24)
MO_v	vertical mobility (1 = first job (i) of lower skill level than highest paying job (h)[h]	5.13 (1.43)**	7.78 (3.33)*

TABLE VI-4 (continued)

	Skilled Craftsmen	Semiskilled Operatives
$MO \times T_{ft}^{(h)}$ Interactions		
$MO_L \times T_{ft}^{(h)}$	6.22 (8.27)	.72 (14.08)
$MO_v \times T_{ft}^{(h)}$	9.35 (3.88)**	11.23 (4.10)**
C Constant	98.54 (19.79)**	88.39 (18.03)**
$\bar{X}$	169.74	159.95
R^2	.11	.24
S.E.E.	23.10	18.05
F Ratio	2.29**	3.68**
N	310	209

‡Includes all workers who reported reaching either skilled craftsmen or semiskilled operative jobs while with the company. Earnings are weighted by an index of average earnings for production workers in manufacturing in Wisconsin. See Bureau of Labor Statistics, op. cit.

[a]Standard errors in parentheses.

[b]Includes graduates of apprenticeship programs.

[c]Variables are not mutually exclusive.

[d]Equals age at time of first Gisholt job minus number of years of education minus six.

[e]Formal training includes on-the-job instruction, classroom instruction, and a combination of both on-the-job and classroom training. No formal training is equivalent to "learning by doing."

[f]Referenced to workers who never changed jobs.

[g]A lateral job change is defined as a change in duties and occupational responsibilities which does not ential a change in skill level, that is, movement from unskilled to semiskilled, or from semiskilled to skilled job classifications.

[h]Vertical job changes require a change in skill levels, that is, a movement out of unskilled, semiskilled, or from semiskilled to skilled job classifications.

*Significant at the .05 level.

**Significant at the .01 level.

+Significant at the .10 level.

individual earnings of job changers. Benefits from such training seem to be concentrated at the higher end of the occupational ladder, that is, for persons entering at the semiskilled operative level and above. Among workers in this group, on-the-job training appears tc be associated with a relatively lower level of average weekly earnings, compared to the earnings of workers who have formal training on their first jobs. At the same time, workers appear to benefit from a mixture of on-the-job training and classroom instruction as compared to on-the-job training alone on both their first jobs and highest paying jobs. This partially reflects the inadequacy of on-the-job training as a sole method of worker preparation especially in periods when the supply of qualified or experienced semiskilled and skilled workers is short relative to employer demand.

Workers are likely to increase their earnings benefit even more if they can acquire new, higher paying positions, requiring additional formal training and further improvements in skill.

2. Training and Worker Promotability

An additional benefit resulting from company training practices is the contribution of training to the pace of worker promotion within the firm. As viewed by workers, speedy promotion within the firm may be associated with higher status levels both at the work place and within the community at large. Workers may be willing to accept lower wage rates or positions of lower status in the present in the anticipation that company-provided training will increase their chances for future promotion and higher earnings with the firm. From the employer's perspective, workers receiving training on entry jobs may be considered desirable for promotion, since the cost of providing added training on post-entry jobs tends to be inversely related to the amount of training provided for entry purposes.

Therefore, we hypothesize a faster rate of promotion for employees receiving entry level training compared to those who acquire skills primarily through

alternative means. In addition, since classroom instruction was used selectively, we anticipate differential rates of promotion for workers receiving different types of entry level instruction.

As in the analysis of worker earnings, an appropriate test of the hypothesis requires detailed information on all jobs held by workers during their tenure with the firm. Scanty data on a few specific jobs, gathered through mail and personal interview surveys, cannot possibly reflect the total extent of worker mobility; neither can they indicate the complexity of this mobility, that is, the number and importance of horizontal and vertical moves.

However, while detailed information on all job changes is crucial for a study of internal labor market mobility per se, the absence of this information is of less consequence to the current research objective. Our hypothesis suggests a direct relationship between entry training and the rate of worker promotion. Thus, we are interested in the final outcome of promotion, namely, the highest ranking job obtained by a worker, the time it takes to reach this job, and the amount of initial training received in the first company job.

For purposes of this research, the highest ranking job obtained by a worker is defined as that job on which he earns his highest hourly wage rate while employed with the firm. Once again, an index of earnings for production workers in Wisconsin is used to control for the effects of time in the analysis.[11] Workers indicating no job changes (as measured by our survey) are not included in the analysis. The rate of promotion (RP) is defined as the number of months required to obtain this highest paying position after joining the firm.[12]

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[11] An alternative means of ranking jobs is to utilize pay or labor grades established by the company. However, labor grades are constantly changing, just as the skill requirements of jobs they represent are not stable over time. Admittedly, the earnings approach we have adopted is not a perfect measuring technique, but it does permit us to standardize the work histories of workers with respect to time.

[12] The reader will recognize this variable as being very similar to T_M, total time employed with the company. The latter, however, includes time spent working at the highest paying position.

In general form, RP is specified as a linear function of the following previously defined variables: (1) D_a, age at time of entry; (2) D_{ed}, years of school completed; (3) S', the set of prior experience and training variables, including S'_{hs}, S'_{ph}, S'_{af}, S'_o, and S'_{te}; (4) $T_{oc}^{(ih)}$, a dummy variable representing whether the highest paid job (h) is similar to the first company job (i) as measured in this study; (5) M, the method of preparation on the first company job, categorized as "learning by doing" (M_{lbd}), on-the-job training (M_{ojt}), and on-the job training supplemented with classroom instruction ($M_{ojt+cls}$); and (6) Y, the year of entry into the company.

Results--As reported in Table VI-5, this model appears to be a better predictor of RP for persons obtaining craftsmen positions than for workers reporting highest earnings on semiskilled jobs. R^2 for the former group is .45, while it is .31 for the latter. In addition, the craftsmen regression is highly significant at the .01 level; the operative regression is not statistically significant at a minimal level of confidence, that is, .10.

Of the results reported in Table VI-5, the significant coefficients corresponding to the variables year of entry (Y), method of first job preparation (M), and prior occupational experience within the firm ($S'^{(ih)}_{oc}$) have important implications for this research. Year of entry seems to significantly influence RP in both equations even after the data are adjusted for time. The magnitude of the coefficients, moreover, are roughly comparable. More recent entry to the firm by one year reduces RP by nearly eight months for persons reaching the craftsmen level. The same change in Y for persons obtaining the semiskilled operative level reduces RP by five months. The negative direction of the coefficient is clear documentation of the company's increasing reliance upon internal promotion in later years. Although these promotions were usually based upon accumulated seniority, there is evidence from these equations that the elasticity of RP with respect to promotion time was decreasing. As the year of entry advances, it takes lesser amounts of seniority to achieve comparable promotion rates.

TABLE VI-5

ANALYSIS OF TIME (MONTHS) REQUIRED TO REACH HIGHEST PAYING POSITION BY OCCUPATION[a]

Variable		Regression Coefficients and Standard Errors[b]	
Symbol	Definition	Skilled Craftsmen[c]	Semiskilled Operatives
D	Demographic factors		
D_a	Age at time of entry (years)	11.3 (13.8)	-16.1 (17.9)
D_{ed}	Educational attainment	32.3 (17.5)+	27.1 (27.0)
S'	Vocational training and related experience both prior to and during employment by Gisholt[d]		
S'_{hs}	high school vocational education (1,0)	4.5 (8.0)	5.3 (10.8)
S'_{ph}	post-high school vocational education (1,0)	- 6.2 (9.2)	- 8.9 (16.7)
S'_{o}	other (1,0)	- 3.6 (9.9)	- 2.2 (18.6)
S'_{af}	armed forces training (1,0)	- 3.6 (8.4)	- .2 (12.0)
S'_{te}	total time eligible for employment[e]	19.7 (5.3)*	11.4 (9.3)
Y	Year of entry	- 7.8 (3.6)	- 5.2 (1.6)**
M	Method of preparation on first company job:[f]		
M_{ojt}	on-the-job training	.8 (1.5)	2.3 (3.3)
$M_{ojt+cls}$	on-the-job plus classroom training	-21.0 (1.7)**	- 3.0 (10.3)
$T_{oc}^{(ih)}$	prior experience in a related occupation while employed at Gisholt	-19.6 (9.1)*	10.3 (13.8)
C	Constant	19.4 (2.3)**	29.9 (3.1)**
$\bar{X}$ (months)		52.3	51.1
R^2		.45	.31
S.E.E.		57.3	69.3
F-Ratio		11.45**	1.97
N		213	120

TABLE VI-5 (continued)

[a]All workers reporting no change in job while with the company are omitted from this analysis.

[b]Standard errors appear in parentheses.

[c]Includes completors of apprenticeship training programs.

[d]Variables are not mutually exclusive.

[e]Referenced to period before joining Gisholt.

[f]Referenced to workers claiming M_{1bd}; categories are mutually exclusive.

$\bar{X}$ = Mean of dependent variable.

R^2 = Coefficient of determination.

S.E.E. = Standard error of estimation.

N = Number of observations.

\+ = Significant at the .10 level.

* = Significant at the .05 level.

** = Significant at the .01 level.

Contrary to the hypothesis, the relationship between the method of entry job preparation and RP, holding other things constant, is significant in only selected instances. In both equations reported in Table VI-5, employees receiving formal on-the-job instruction on their first company jobs advanced to higher paying jobs as quickly as did those workers not requiring any formal occupational instruction. Thus, when faced with the need to promote a worker, this employer neither favored nor discriminated against those workers who acquired skills through the on-the-job approach.

However, among employees eventually obtaining craftsmen level positions, the classroom+on-the-job method of preparation seems to have affected the rate of worker promotion. Recipients of this instruction, it would appear, reached their highest earnings level nearly two years sooner than persons requiring no formal

entrance training. Since variable $M_{ojt+cls}$ includes workers initially trained in company apprenticeship programs, the coefficient for this variable in the craftsmen equation was anticipated. As company officials frequently remarked, craftsmen trained through the company's apprenticeship route tended to display speedy and dramatic promotions to new positions with the firm. Had our regressions focused on promotions to first-line supervisory positions, jobs frequently held by former apprentices, we would expect to document even faster rates of promotion for the graduates of company apprenticeship programs.

$M_{ojt+cls}$ also includes workers who received classroom and on-the-job training, but who were not part of a formal apprenticeship training program. Of course, such non-apprentices received less training than the apprentices, but regression results reported in Table VI-5, and other results not reported in this table,[13] point to increased rates of promotion for such non-apprentice workers.

What is it, then, about the classroom+on-the-job training method of instruction which produces this effect? Regression analysis, for all its analytical advantages, gives few clues; rather, the answer must be gleaned from information obtained through personal interviews with company representatives. During those interviews, company spokesmen often alluded to two possible explanations. First, the company maintained an unofficial, unwritten policy of favoring former apprentices in many areas of company operation. Apprentices, despite their contractual ties to the labor union bargaining unit, were generally under the immediate supervision and direction of nonbargaining unit personnel. In fact, the company viewed its apprenticeship program as a breeding ground for future supervisory personnel, and frequently prospective apprentices were enticed with unofficial claims of promotion within the firm. Under these conditions, it is not surprising to find former apprentices receiving fast rates of promotion after completing their indentures.

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[13] When former apprentices are deleted from the regression model for craftsmen, the coefficient for M_{ojt_cls} remains significantly negative.

A second explanation seems more applicable to all workers initially trained with the classroom+on-the-job method, not just apprentices. Classroom instruction, which usually focused on general or theoretical subjects, broadened the occupational knowledge of employees. Participants in this type of entry-level instruction, therefore, possessed a superior potential for promotion, compared to the already proficient new hires (those reporting the "learning by doing" approach) whose skills tended to be narrower. The company, it appears, utilized this breadth to its advantage by favoring workers with such general knowledge, probably as a means of reducing post-entry job training costs.

Table VI-5 also reports the effect of occupational experience in a related company job, represented by variable $T_{oc}^{(ih)}$. A comparison of the occupational requirements of their first and their highest paying jobs revealed that prior occupational experience in a related Gisholt job reduced RP for craftsmen by approximately 20 months. Comparable experience among persons reporting operative jobs as their highest paying company position does not result in a significant regression coefficient. Although based on limited evidence, the results suggest that upwardly mobile skilled craftsmen move most rapidly from other skilled occupations, whereas unskilled workers move most rapidly into semiskilled jobs. Thus, a policy designed to encourage worker upgrading in industry should seek to reinforce the natural and dominant patterns of worker internal labor market mobility, namely, relatively rapid promotion from unskilled to semiskilled jobs. The movement from semiskilled to skilled positions should be recognized as a lengthier process involving more extensive training.

3. Time Required for Job Competence

The final dependent variable studied in this chapter is what we have called total time needed to feel competent at a job (JC). This variable should be distinguished from the amount of formal training since JC represents continued

improvements in individual productivity after formal instruction ends (or in the absence of formal instruction) as a result of actual job performance.

It is argued that new hires or new placements receiving formal training displayed faster improvements in their further skill development than workers who appear qualified for employment without formal training. Company-trained employees had a headstart over supposedly qualified new hires, since the former group was directly exposed to company-specific aspects of the job during training. Even a qualified worker, displaying prior experience or training in an occupation, required a period of orientation to a new job. Such a period did not constitute training because no new occupational skills or knowledge were being developed; rather, it was during this period that a worker, as a result of actual job experience, polished his present skills and adjusted to such unfamiliar aspects of a job as: (1) its location in the flow of production within the firm; (2) the organization of component tasks comprising the job; (3) the level of required performance, including the amount, quality and other unique characteristics of output; (4) company policies governing work; (5) company and union work rules; and (6) the amount and characteristics of worker supervision.

At first glance, the reader may claim that worker productivity has already been related to training in the analysis of individual post-training earnings. But, as argued, within a specific plant earnings reflect productivity gains as well as many other factors such that some improvements in worker productivity may, at least in the short run, go unrewarded.

Because of constraints implicit in the research design, it was decided to ask individual workers to specify how much practice and actual on-the-job experience it took for them to become reasonably competent at a specific job <u>after training ended or in the absence of training (JC)</u>. Naturally, such subjective assessments are replete with "noise": one man's view of competency is another man's view of skill deprivation. Our analysis of JC reported below underscores the gravity of

such measurement errors; but, at the same time, formal training appears to be negatively associated with the level of JC reported by workers.

Table VI-6 reports the analysis of JC (measured in hours) associated with entry-level jobs for each major occupational group. The 12 regressors reported in this table are the same as those used in the analysis of first job earnings (E_i). The absence of significant regression coefficients is immediately apparent for demographic variables designated as D and for other variables representing types of pre-Gisholt training and related employment experiences (S). Interestingly, however, the sign of the coefficients corresponding to a large number of pre-Gisholt experience variables in each equation is, as one would anticipate, negative. In a notable number of instances these coefficients are greater than their respective standard error. More refined estimates of JC should reduce the magnitude of these errors relative to the magnitude of the regression coefficient.

Variables representing the method of worker preparation, M, indicate that formal training--given both on-the-job and in a classroom--is associated with a significantly faster growth in worker competency than the growth rate claimed by untrained workers. Values of the effect range from -44.5 hours for craftsmen given on-the-job instruction to -103.7 hours for semiskilled operatives with the same method of first-job preparation.

As hypothesized, training does seem to give workers a headstart towards reaching a future level of job competency. But the magnitude of the coefficients suggest that other factors are at work as well. Unfortunately, our discussions with company representatives, shop foremen, and the workers themselves fail to suggest the nature of these additional factors.

Finally, these results should not be interpreted to mean that a new worker requiring training is relatively more desirable than one requiring no training. By definition, there are less costs involved in hiring already qualified workers. Rather, training seems to lay a sound foundation upon which workers can build further increases in their job competence through actual job experience.

TABLE VI-6

REGRESSION ANALYSIS OF TIME REQUIRED TO FEEL COMPETENT IN FIRST GISHOLT JOB (IN HOURS) BY OCCUPATIONAL GROUP[a]

Variable			Regression Coefficients and Standard Errors[b]			
	Symbol	Definition	Skilled Craftsmen[c]	Semiskilled Operatives	Clerical Workers	Laborers
D	Demographic factors:					
	D_a	Age at time of entry (years)	5.7 (6.1)	5.4 (5.0)	12.2 (11.1)	4.3 (3.3)
	D_{ed}	Educational attainment (years)	-7.7 (13.1)	-6.9 (6.1)	4.9 (3.8)	-6.2 (7.2)
Y	Year of entry[d]		-1.9 (1.3)	-1.8 (1.2)	3.2 (5.8)	-2.6 (2.2)
S	Pre-Gisholt training and related employment experience:[e]					
	S_{hs}	high school vocational education (1,0)	-36.4 (22.0)+	-5.8 (36.3)	-23.2 (58.7)	-84.7 (56.8)
	S_{ps}	post-high school vocational education (1,0)	-40.7 (30.7)	-38.1 (35.9)	-136.7 (65.4)*	-83.2 (84.2)
	S_o	other (1,0)	-40.5 (33.5)	-1.9 (28.4)	-64.1 (156.1)	-64.9 (63.8)
	S_{af}	armed forces vocational training (1,0)	-16.3 (13.2)	-7.1 (25.3)	-31.1 (70.3)	-35.9 (56.9)
	S_{oc}	prior exp. in a related occupation	-34.9 (24.6)	-23.9 (23.6)	-44.6 (67.6)	-22.9 (45.9)
	S_{te}	total time eligible for employment (years)[f]	3.1 (2.3)	2.7 (2.1)	5.3 (3.3)	2.5 (1.7)
M	Method of preparation on first job at Gisholt[g]					
	M_{ojt}	on-the-job training (1,0)	-44.5 (20.9)*	-103.7 (56.9)+	-107.6 (79.4)	-49.5 (23.6)*
	$M_{ojt+cls}$	on-the-job training plus classroom training (1,0)	-60.4 (26.8)*	-88.6 (25.8)**	I.O.R.	I.O.R.
C	Constant		186.0 (69.2)*	116.7 (44.1)**	105.9 (191.3)	157.2 (71.2)*

TABLE VI-6 (continued)

	Skilled Craftsmen	Semiskilled Operatives	Clerical Workers	Laborers
$\bar{X}$	215.3	209.8	180.8	138.8
R^2	.16	.21	.36	.20
S.E.E.	66.9	56.7	36.8	34.6
F Ratio	4.30**	6.43**	1.85	2.22+
N	237	253	44	100

[a]Based on subjective judgments of competence after training ended or in the absence of training.

[b]Standard errors appear in parentheses.

[c]Excluding workers claiming formal apprenticeship training with Gisholt Company.

[d]An index variable going from 1 to 50, corresponding to years 1920 through 1970.

[e]Prior training variables not mutually exclusive.

[f]Defined as [(age at time of entrance)-(years of school) - 6].

[g]Referenced to workers classified as M_{lbd} ("learning by doing"); categories of this variable are mutually exclusive and coefficients represent deviations from the referenced variable mean.

$\bar{X}$ = Mean of dependent variable.

R^2 = Coefficient of determination.

S.E.E. = Standard error of estimation.

N = Number of observations.

+ = Significant at the .10 level.

* = Significant at the .05 level.

** = Significant at the .01 level.

I.O.R. = Insufficient observations for regression.

4. Limitations on Results

Inasmuch as methodological problems are discussed in a separate chapter of this study, it is unnecessary to dwell on methodological issues at this time. However, two methodological caveats are required in order to place this chapter's results in their proper perspective.

First, like any set of findings based on one set of data, our estimates of benefits resulting from company-sponsored training should be viewed as preliminary rather than final calculations. Due to measurement and sampling errors, the magnitude of these estimates will undoubtedly vary across samples. The sign of the relationships between variables in the analysis should remain stable across samples, however,

Second, despite efforts to conduct a comprehensive survey of all company employees, the eventual sample omits important groups of workers. Perhaps the most serious omission concerns workers who joined the firm during previous years and who left prior to 1970, the year on which the sample is based. There is no way of knowing or inferring the training histories of such workers. Equally as important to the study are the workers who were denied employment by this firm. Since the firm's training efforts varied in response to changing labor market conditions, the scope of this research should have encompassed the nature of labor supply facing the firm over time, including the quantity and quality of all applicants for employment. Our suggested models offer only indirect means for inferring the relative importance of changing labor market conditions to company training practices; usually, the year of entry variable, Y, is used as a proxy for a host of factors associated with changing market conditions.[14] It should also be stressed again that the regression analyses omit workers who never changed jobs at Gisholt.

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[14]Attempts were made to develop measures of labor supply facing the firm over time. One obvious method was to use labor market unemployment rates as an added independent variable. Larger rates of unemployment should denote a larger pool of qualified applicants, requiring lesser amounts of company-provided training. Surprisingly, when included in the models, the rate of unemployment was found to be

5. Conclusion

Although this chapter has examined selected consequences of company-sponsored training, the analysis confirms that both workers and employers benefit from the training activities of the firm. In this chapter, workers who received training were compared to those who were judged reasonably qualified for a job and who received no formal instruction. On the basis of the comparison, the following conclusions are warranted with regard to the benefits of training accruing to workers:

1. Training given newly hired employees is not always associated with higher levels of post-training average weekly earnings. On-the-job training, the most frequently used method of formal instruction, tends to be negatively related to post-training earnings, while a mixture of training techniques combining classroom training with on-the-job instruction is positively related to individual earnings. The analysis suggests, therefore, that on-the-job training is not as effective a method of worker preparation as is the more comprehensive combination of classroom and on-the-job training sessions. The inadequacy of on-the-job training appears to become greater as we move up the occupational ladder, requiring the firm to intensify and expand its training efforts in order to compensate workers for their relative lack of prior training and related employment experiences.

In assessing this finding, it is necessary to recall the low degree of coordination and structure which characterized on-the-job training programs at this plant. Thus, the above conclusion is partly dependent upon the quality of the on-the-job training, a factor which we were unable to assess in comparison with other plants.

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unrelated to the amount of training received by workers on their entry-level positions with the company. The problem with using city-wide unemployment rates was found to be two-fold. First, to the extent the composition of city-wide unemployment reflects the characteristics of workers in the local labor market, unemployed in this area are mostly white-collar workers. Second, unemployment is negatively correlated with year of worker entry into the firm. A simple correlation between the two variables equals nearly -.9. Unfortunately, at the local labor market level no alternative series on labor supply is available on a monthly basis.

2. The effectiveness of the classroom+on-the-job approach in worker training is underscored by the impact such training had upon worker promotion within the firm. Recipients of this combined on- and of-the-job method as preparation for their first Gisholt jobs tended to reach their highest craft positions within the firm at a faster rate than either those trained solely with on-the-job instruction or those who supposedly needed no added instruction at all.

3. From a worker's perspective, training received on his initial Gisholt job laid a sound foundation for mastering the duties and responsibilities associated with subsequent positions at Gisholt. Looking at the highest paying job held by persons in our sample, those who received formal training initially were also those who eventually earned substantially more per week. The magnitude of this benefit, of course, was directly related to the occupational level eventually obtained.

4. Additionally, training given in connection with worker promotion to a new company job results in sizable benefits to promoted employees.

The regression results reported above also indicate that a program intended to achieve worker promotion and upgrading within the firm by encouraging employers to provide necessary training can be a success. Such a policy is perhaps best focused on industries, areas, or occupations in which notable shortages prevail, since it is in these situations where worker upgrading is more likely.

5. From the company's perspective, formal training is intended to alter the productivity of certain workers. The principal benefit of training, therefore, must be some measure of improved productivity. Our discussions with company officials failed to produce a simple and inexpensive means of assessing worker productivity. Not all jobs within the plant, for example, involved standardized or even similar procedures. In many cases a tangible product was not produced, and where physical output could be counted, there was a wide variance in the nature of the product. Indeed, it was for these reasons that the Gisholt Company made

no systematic attempts to gather data on worker productivity or to evaluate the effectiveness of its training programs. As discussed in the next chapter, similar obstacles surrounded the collection of data on training costs. Given the absence of data on productivity, our analyses followed the customary practice of using employee earnings as a proxy for productivity. If this assumption is correct, the company benefited from increased productivity as the employee benefited from promotion and increased earnings through training programs.

CHAPTER VII

THE COSTS OF TRAINING

Data on the costs of company training are even more elusive than other types of statistical information on company training programs. It is possible to obtain some information on the employees' own expenditures on tuition, books, and materials in the institutional training programs taken prior to their Gisholt employment. Tabulations of these costs are presented below. However, the data required for the determination of the opportunity costs of training on the job, such as the comparison between learner's wages and the full rate for the job, could only be obtained from company records. Company records are also needed for data on instructional costs. This involves probing and much digging by the research investigators. In our view, it calls for a level of company cooperation which would not be readily forthcoming in a large-scale survey.

1. Employee Costs of Pre-Gisholt Institutional Training

Despite our efforts to gather information on employee costs of training directly from workers, we were unable to obtain reliable estimates from all appropriate respondents. The problem was especially thorny for workers who received the mail questionnaire survey; final returns from this group yielded spotty data on the personal costs of institutional training. Returns from interviewed respondents were more complete and reasonable. Evidently, like employers, workers have to dig back into their records in order to recall the magnitude of training expenses. In the absence of a motivating force such as the presence of an interviewer, workers preferred to take the simple solution and that meant skipping costs questions entirely.

Personally interviewed production employees were asked, "About how much did (an institutional training) program cost you for tuition, books and other expenses such as carfare?"

The responses for the six types of pre-Gisholt institutional training, which had been utilized in earlier analyses, are indicated in Table VII-1. With the exception of post-high school vocational or technical training and training acquired through correspondence courses, the employees' own expenditures for institutional training were relatively modest. Only one of the interviewed employees reported that his high school vocational training cost more than $100 for books and materials. The remainder spent less than $100 on each category of expenditure: tuition, books and materials, and other (primarily travel) expenses. Several of those who took post-high school or technical training reported tuition of over $500, and two indicated that tuition costs exceeded $1,000. A number also indicated relatively large expenditures for books, materials, and other aspects of their post-high school vocational training. These expenditures were traced to persons who graduated from private technical institutes in the Madison area. The vast number of participants in post-high school vocational training had attended local public institutions which are considerably less expensive. Thus, a majority at even the post-high school vocational level reported total expenditures in each of the categories of less than $100. Since the cost of related instruction for apprentices is absorbed by employers in Wisconsin, it is not surprising that tuition costs were not high for those who took apprenticeship training prior to Gisholt; their other expenses were also relatively low.

As might be expected, almost no costs were incurred in connection with government retraining programs, and no payments were made for those who received training in the armed forces. On the other hand, employees who had received vocational instruction in correspondence courses prior to Gisholt paid tuition ranging from less than $100 to between $500 and $1,000.

TABLE VII-1

DISTRIBUTION OF EMPLOYEE TRAINING COSTS BY TYPE OF COST AND TYPE OF TRAINING PROGRAM FOR PRODUCTION WORKERS IN THE PERSONAL INTERVIEW SAMPLE[a]

Type of Training Program and Type of Cost	Number of Interviewed Workers Report Costs of: Less Than $100	$101-$200	$201-$500	$501-$1000	More Than $1000
1. High school vocational or technical training					
a. tuition	1	0	0	0	0
b. book & material expenses	54	1	0	0	0
c. other expenses	51	0	0	0	0
Number claiming this type of training = 55					
2. Post-high school vocational or technical training in a vocational school or jr. college					
a. tuition	24	1	3	3	2
b. book & material expenses	26	4	2	1	0
c. other expenses	24	3	3	5	0
Number claiming this type of training = 33					
3. Apprenticeship programs prior to employment at Gisholt					
a. tuition	1	0	0	0	0
b. book & material expenses	2	1	0	0	0
c. other expenses	5	0	2	0	0
Number claiming this type of training = 7					
4. Government retraining programs					
a. tuition	0	0	0	0	0
b. book & material expenses	1	0	0	0	0
c. other expenses	0	0	0	0	0
Number claiming this type of training = 6					
5. Correspondence school					
a. tuition	1	1	7	2	0
b. book & material expenses	0	0	0	0	0
c. other expenses	9	0	0	0	0
Number claiming this type of training = 11					
6. Vocational training/armed forces					
a. tuition	0	0	0	0	0
b. book & material expenses	0	0	0	0	0
c. other expenses	0	0	0	0	0
Number claiming this type of training = 42					

[a]Total number personal interview respondents = 173.

2. Training Costs at the Gisholt Company

The case study approach designed to gather data on company training costs proved to be a microcosm of all the problems encountered in previous surveys of many firms. Few costs of training were gathered on a systematic basis; data that were available were scanty, unreliable, and scattered throughout the firm. Many real costs stemming directly from training were often attributed to nontraining-related activities. In addition, our research was hampered by the timing of the study which made actual collection of the limited aount of available information extremely difficult. The period we had reserved to collect these data coincided with the plant's closure, and company officials became increasingly reluctant to cooperate with us as layoff procedures became understandably more important.

The gathering of training cost data mirrored the problems of collection of other training data within the firm. Only the most obvious and easiest to measure costs of training, usually those of some actuarial importance, were kept on a regular basis. Examples of such costs were (1) payment for physical supplies of training; (2) tuition reimbursement costs; (3) salaries to instructors; (4) payments to outside organizations for conducting training; and (5) the budgetary costs of administering and coordinating training, such as the salaries of full-time training director and his staff. But even in these cases of supposedly available information, an extensive canvassing of many departments was needed for a complete record. When we were able to track down the location of a particular piece of information, we found the data to be generally up to date, but not always in an appropriate form for easy retrieval. Most records on available budgetary costs of training could not be easily prorated among the many programs for which they were incurred.

As previous research has documented, information on the indirect costs of training were almost nonexistent on a regular basis. Although economic theory points to an entire "shopping list" of indirect or opportunity costs associated

with company-sponsored training, we sought to obtain only simplistic examples of the loss of production or revenue during, or as a result of, training. Our principal concern involved forgone production of trainers (either fellow workers or supervisors) during the training period and the cost of lost production from workers which was not offset by lower wages during the training period. Candidly, company managers acknowledged the importance of these indirect costs, but as one official admitted, "In a firm of this size, with all these different jobs, it is almost impossible to estimate these costs on a case by case basis."

Nonetheless, we encountered many instances of company concern for the indirect costs and consequences of its training practices. The person in charge of plant maintenance, for example, was very much concerned with expenses incurred due to faulty or inadequate worker preparation. When machine breakdowns appeared attributable to faulty operation, he would inform first-line supervisors of the problem, hopeful that his reports would lead to additional worker training. Yet, no official records were kept on the frequency of these occurrences. Similarly, managers of company sales and promotion were very conscious of any loss in product sales attributable to high labor costs and poor worker productivity. Here, again, evidence was anecdotal, and systematic study of these indirect costs was never undertaken.

This is not to say that the company was not concerned with the costs of training in its decision-making processes. Rather, it was felt that continuous and systematic study of the costs of training would be too costly. As mentioned previously, managers felt that appropriate decisions could be made through an intuitive understanding of the costs of training and by relying on information gained from a few extensive studies of training costs, conducted many years ago by the industrial engineering and personnel departments. These studies--which incidentally could not be found in company records for our examination--estimated

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that average costs of on-the-job training approximated $500 during the first four weeks of employment for newly hired workers, and that such costs totaled about $10,000 per employee for apprenticeship programs.

While the chances of obtaining extensive data on the costs of training directly from employer files appear to be bleak, the study encountered three encouraging signs. First, the company did gather information on the wage costs of newly hired and newly promoted employees for internal accounting purposes. Wages paid employees during their probationary period were charged to a separate salary fund within the personnel department, earmarked exclusively for what were called "direct training costs." Charges to this account were not merely paper costs. Monies were actually transferred out of this contingency fund so that unit labor cost and the final product costs would not reflect short-run training expenses. Our attempts to examine these charges, however, were met with stern resistance, since they were part of the company's general payroll records.

To the extent that training salary funds are a common practice in the machine tool building industry, future studies of company training might use the fund as a profitable source of information. We would urge researchers to approach an analysis of these funds with some caution, however. In Gisholt's case, wage expenses charged against the fund were simply the wage bill for trainees (hourly probationary rate times number of hours employed). Although company officials viewed these charges as a crude measure of lost productivity during training, we found that no attempt was made by the firm to subtract the value of the product produced by trainees. Moreover, these entries did not include estimates of the forgone production of supervisors or trainers during the training process.

Second, we found some encouragement in the fact that workers and supervisors appeared capable of providing reasonable estimates of the time they spent instructing new placements on the job. Again, we urge caution in using these estimates to derive the total dollar value of forgone production during training.

Supervisor pay rates may already take into account their instructional responsibilities. Additionally, both foremen and workers who serve as trainers may instruct during slack periods in their own work, as demonstrated in a previous chapter. Thus, while workers themselves are the only source of this information, their responses must be placed within the institutional context of the firm--that is, within a framework of general knowledge of training practices in the plant.

Finally, after discussing the company's training practices with a large number of company officials, we were impressed by their desire for more systematic knowledge concerning the structure and scope of training costs. Surprisingly, their thirst for additional information on the costs of training was greater than their thirst for information on the benefits of training. Given the company's view of training from its perspective, the benefits of training were obvious. There was little question that given its customary occupational needs, the firm was required to train employees. But company officials felt that training costs, like all costs of operation, should be held to a minimum, particularly during slow economic periods.

3. Conclusions

Efforts to obtain data on training costs at Gisholt were as discouraging as our earlier efforts to determine the availability of such data in a national sample of firms. Even interviews with workers could provide only some additional types of cost information beyond those available from management personnel.

However, there were also some encouraging signs. The Gisholt Company maintained some records that might permit a calculation of important aspects of opportunity costs. And workers and supervisors might be able to recall other data that would contribute to the determination of opportunity costs of training. But, most important, the company officials are concerned about cost data, and it is likely that they could be induced by surveyors to maintain the necessary records which

could be used in surveys of training costs in industry. However, this would involve a combined program of education, exhortation, and specific instruction. Without this approach prior to a training survey, the survey would probably be doomed to the collection of sparse and unreliable data on the costs of company training.

CHAPTER VIII

EMPLOYMENT AND TRAINING EXPERIENCE AFTER THE PLANT SHUTDOWN

Substantial layoffs and the subsequent complete closure of the Gisholt Company in Madison during the course of this study provided an opportunity to trace the employment experience, transferability of skills, and additional training of the workers who have been surveyed when they were employed at Gisholt. However, due to the nature of the Madison job market and the brief period available for study following the principal layoff, the value of the post-shutdown analysis is limited.

As previously noted, there are few comparable industrial facilities in the Madison area. Workers displaced at Gisholt could not be expected to find alternative employment opportunities similar to those that would be available to them in a larger, more industrialized city.

Although some of those included in the survey had been laid off as long as 16 months previously, most of those who were no longer working with the company at the time of the survey had been laid off for less than six months. Their continued unemployment during this relatively short period is partly explained by the existence of a Supplemental Unemployment Benefit Plan (SUB) from which they received benefits in addition to state unemployment compensation. In the words of one job counselor in the Madison Office of the Wisconsin State Employment Service:

> For a long time, the laid-off workers did not know how long it would be before recall, so they rode out the first few months. After all, these men could earn as much as $110 a week, once you add the SUB to their regular weekly benefit. That's almost as much as they were earning at Gisholt, after you deduct transportation costs.

As these benefits were exhausted, Employment Service job counselors observed a large proportion of the former Gisholt employees who seriously considered accepting lower paying jobs in the Madison area. Some workers expressed their intention to move to other areas in search of employment which was more similar to their Gisholt jobs than any employment available in Madison. In fact, we can

infer from unopened, returned questionnaires that some of the workers had already moved at the time of the survey. Few, if any, movers were included among the respondents.

1. Post-Gisholt Employment Experience

Of the 659 respondents included in the mail questionnaire and personal interview surveys, 388 (58.9 percent) reported that they were no longer employed at the Gisholt Company at the time of the survey. Ninety-five percent of the workers who were no longer with the company indicated that they had been laid off; the remainder left for a variety of other reasons.

The 388 laid-off employees reported that they had tried many methods in their search for new jobs, including such formal agencies as the State Employment Service and such informal procedures as contacts with friends and relatives. The percentage reporting use of the various methods of job search are indicated below:

Method of Job Search	Percentage of Workers
State Employment Service	69.8
Private employment agencies	22.9
Newspaper want ads	66.7
Direct company applications	71.9
Contact with friends and relatives	69.1
Other methods of job search	19.0

In spite of these job search procedures, only 163 (42 percent) of the 388 displaced workers reported that they had succeeded in obtaining some work in the period since leaving the Gisholt Company. The remaining 58 percent were either unemployed throughout the period after the shutdown or had left the labor force. A follow-up analysis of the effectiveness of these alternative job search procedures shows no single method or combination of methods to be significantly more effective. This conclusion, however, is based solely on the extensiveness of the search effort; a somewhat different conclusion might be warranted if we were able

to measure the intensity of the search as well.[1]

Characteristics of Post-Gisholt Jobs

Most displaced workers who found jobs in the post-Gisholt period changed either the industrial or occupational identification of their employment. As is seen in Table VIII-1, only 18.9 percent of these workers were able to find employment in durable manufacturing, the industrial classification of the Gisholt Company. And, of these, only 11.2 percent were engaged in the manufacture of machines, as they had been at the Gisholt Company. However, 11.6 percent of the workers reported employment in service and repair work which may have been related to the types of jobs performed by some of the skilled craftsmen in their earlier employment. Similarly, the 11.1 percent who reported post-Gisholt work in the construction industry included some of the craftsmen who were able to transfer their skills from manufacturing to building construction.

TABLE VIII-1

INDUSTRIAL CLASSIFICATION OF JOBS HELD IN THE POST-GISHOLT PERIOD

Industry Classification	N	%
Agriculture, forestry and fisheries	6	3.4
Construction	18	11.1
Manufacturing		
Nondurable	28	17.2
Durable	30	18.9
1) Primary metal	3	2.1
2) Machinery except electrical	18	11.2
3) Transportation equipment	3	2.1
4) Scientific instruments	6	3.4
Communications	3	2.1
Wholesale trade	9	5.6
Retail trade	37	22.7
Service and repair work	19	11.6
Government--state, county and local	10	6.0
Nonascertained	3	1.9
All industries	163	100.0[a]

[a]May not equal 100.0% due to rounding.

[1]The importance of job search intensity is described in Albert Rees, "Information Networks in Labor Markets," American Economic Review (May 1966), pp. 559-566.

Re-employed workers also reported extensive changes in their occupation, compared to their former highest paying occupation while working for Gisholt. As seen in Table VIII-2, only 34.4 percent of the workers previously holding craftsmen-level positions at Gisholt were able to find a job requiring craftsmen-level skills. An even smaller proportion of former semiskilled operatives (12.3 percent) acquired operative positions after their discharge.

Determinants of Post-Gisholt Employment

The data indicate that those who were last employed at Gisholt as skilled craftsmen were more successful than other occupational groups in finding employment. Of the 388 workers, 199 had been skilled craftsmen at the time of their displacement. Fifty percent of these workers reported that they were able to find employment in the post-shutdown period. Only 38 percent of the 150 displaced operatives (semiskilled) reported that they were employed after the shutdown, and only 18 percent of the 39 clerical and unskilled Gisholt employees, included in the sample od displaced workers, reported that they found work after the shutdown.

However, the simple proportionality--number of employed within an occupational group divided by the total number seeking employment--says little of the probability of employment. It is useful to express probabilities in conditional terms, after controlling for selected factors through regression analysis.

Table VIII-3 reports the regression statistics when the dependent variable "employed versus not employed" (number coded 1 or zero respectively) is regressed on a set of relevant independent variables including: age at time of separation from the company (D_a); educational attainment (D_{ed}); a set of dummy variables corresponding to selected institutional training programs (S'); a set of dummy variables representing the highest paying occupation obtained for those who were last employed at Gisholt ($OC^{(h)}$); a dummy variable coded 1 if this highest paying occupation was the result of formal company-sponsored training, and coded zero if otherwise; and the length of time (Ln) spent looking for employment.

TABLE VIII-2

OCCUPATIONAL MOBILITY MATRIX: OCCUPATION OF POST-GISHOLT JOB BY OCCUPATION OF HIGHEST PAYING GISHOLT JOB

Occupation of Post-Gisholt Job	Highest Paying Gisholt Job			
	Skilled Craftsmen	Semiskilled Operatives	Clerical Workers	Laborers
Professional and technical	-	-	-	-
Farm managers and owners	3(3.0%)[a]	3(5.3%)	-	-
Managers, officials and proprietors	15(15.2%)	2(3.5%)	-	-
Clerical	-	1(1.8%)	-	-
Sales	-	34(59.6%)	3(100.0%)	-
Skilled craftsmen	34(34.3%)	-	-	-
Semiskilled operatives	35(35.4%)	7(12.3%)	-	2(50.0%)
Service and repair workers	11(11.1%)	8(14.0%)	-	-
Laborers	-	-	-	2(50.0%)
Nonascertained	1(1.0%)	2(3.5%)	-	-

[a]Proportion of workers in column total.

TABLE VIII-3

FACTORS INFLUENCING THE PROBABILITY OF POST-GISHOLT EMPLOYMENT FOR ALL FORMER EMPLOYEES

Symbol	Variable Definition	Coefficient of Regression	Standard Error of Regression Coefficient
D	Demographic factors:		
D_a	Age at time of separation from company[a]		
	25-30	-.16	.06*
	31-40	-.25	.09*
	41-50	-.33	.09**
	50 plus	-.33	.07**
D_{ed}	Educational attainment[b]		
	10-11	.18	.10+
	12	.10	.06+
	13-14	.21	.12+
	15-16	.01	.17
S'	Vocational training programs taken both prior to and during employment at Gisholt[c]		
S'_{hs}	High school vocational education (1, 0)	.18	.05**
S'_{ph}	Post-high school vocational education (1, 0)	.20	.09*
S'_o	Other (1, 0)	-.04	.07
S'_{af}	Armed forces training (1, 0)	-.08	.05
$OC^{(h)}$	Highest paying occupation obtained at Gisholt[d]		
	craftsmen (1, 0)	.13	.06*
	operative (1, 0)	.11	.05*
$T_{ft}^{(h)}$*	Formal company-sponsored training on highest paying job (1 = received formal training, 0 = no formal training received)[e]	.02	.11
In	Length of time before reemployment (weeks)	.01	.05
C	Constant	.34	.13**

TABLE VIII-3 (cont.)

$\bar{X}$	.42
R^2	.26
S. E. of E.	.17
F Ratio	7.64*
N	388

a Referenced to workers under 25.

b Referenced to workers with less than ten years of education.

c Variables not mutually exclusive.

d Referenced to a combined group of laborers and clerical workers.

e Analogous to variable $T_{ft}^{(h)}$, hours spent in formal training on highest paying job h, as defined in Chapter VI of this report.

$\bar{X}$ Mean of dependent variable.

R^2 Coefficient of determination.

S. E. of E. Standard error of estimate.

\+ Significant at the .10 level.

* Significant at the .05 level.

** Significant at the .01 level.

The results reported in Table VIII-3 point to the following conclusions:

1. Other factors constant, there is very little difference in the re-employment probabilities of craftsmen (.13) and operatives (.11); but both groups have significantly greater probability of employment than the combined group of laborers and clerical workers.

2. Age seems to make the biggest difference in the likelihood of re-employment.

3. A positive relationship exists between educational attainment and re-employment status. However, the low level of statistical confidence associated with the coefficients on education indicates that the educational attainment variables may be reflecting the effects of age. Older cohorts or workers display increasingly greater levels of education.

4. High school vocational education programs and post-high school vocational training programs seem to increase the probability of future employment after leaving Gisholt's employ. But, here again, the probability of participation in either of these two types of institutional training is very much related to age.

5. Longer periods of unemployment and job search are not associated with increases in the post-Gisholt employment probability.

6. Workers who received formal training on their highest paying job at Gisholt found new jobs as frequently as those who did not.

Our discussions with laid-off workers suggest possible explanations for the negative relationship between age and the probability of re-employment. By and large, younger workers were not entitled to extensive benefits from the company's Supplemental Unemployment Benefit Plan which reduces some of the disincentive to work felt by older workers. Because they were younger, these employees had less seniority recall rights and were laid off earlier than were older workers. Moreover, younger employees of the firm displayed relatively less committment or loyalty to the Gisholt Machine Company. We were surprised, for instance, at the

extent to which older employees refused to consider a new job, even after the announced plant closing, on the expectation that some means for saving the company would be found. In all likelihood, it was a mixture of all these factors--SUB, seniority and recall procedures, and individual loyalties to the firm--in addition to the usual employment problems of older workers which explains the strong influence of age as a predictor of post-Gisholt employment.

The regression results reported in Table VIII-5 point to another important factor associated with age: younger workers who obtained employment received lower oearnings compared with those of re-employed older workers. This suggests that the willingness of employers to give and of workers to accept lower pay varied indirectly with age. This difference in pay may well be related to the differences in employment probabilities of younger and older workers.

2. Training on the First Job After Gisholt

The skilled craftsmen and the semiskilled operatives were not only similar in their probability of employment after the shutdown, but for those who found jobs, the likelihood of additional training and the amounts of additional training also were similar in the two groups. Approximately one-third of those who found employment reported that they received additional training on their first job after the shutdown. The skilled craftsmen reported that they received an average of 56.7 hours of training on their first new job; the semiskilled operatives reported an average of 56.5 hours of training on their first job after the shutdown.

A more detailed breakdown of the incidence of added training across different post-Gisholt occupations is provided in Table VIII-4. It is evident from this table that many re-employed workers--both former craftsmen and operatives--received no additional training on their post-Gisholt job.

A number of workers in both samples entered occupations which are not usually

TABLE VIII-4

PERCENTAGE OF WORKERS IN POST-GISHOLT OCCUPATIONS REPORTING ADDED TRAINING BY OCCUPATION OF HIGHEST PAYING GISHOLT JOB

Post-Gisholt Occupation	Highest Paying Gisholt Occupation: Skilled Craftsmen		Semiskilled Operatives	
	Total in Occupation	% Reporting Added Training	Total in Occupation	% Reporting Added Training
Farm managers and owners	3	0.0%	3	0.0%
Managers, officials and proprietors	15	0.0%	2	0.0%
Clerical	-	-	-	-
Sales	-	-	34	47.1%
Skilled craftsmen	34	35.3%	-	-
Semiskilled operatives	35	45.7%	7	42.8%
Service and repair workers	11	54.5%	8	12.5%
Nonascertained	1	0.0%	-	-
TOTAL	99	33.3%	57	35.1%

associated with employer-provided training, such as farm management and private business. Focusing just on those post-Gisholt occupations which are more likely to be related to their employment at Gisholt (namely, skilled craft and semiskilled operative positions), it can be gleaned from Table VIII-4 that significant proportion larger than 50 percent. These results, unfortunately, are based on a limited number of cases. The interesting, though unanswerable, question is: how much added training would have been required if the industrial environment of Madison offered workers greater opportunities for re-employment in the machine tool building business?

Workers who were surveyed by personal interview were asked to indicate the primary method of skill development on their first post-Gisholt job. Of this group, the sample of those who obtained employment after the shutdown included only 53 respondents. The method of their job preparation on the first post-Gisholt job was as follows:

Method of First Job Preparation	Number	Percent
Instruction by fellow worker	18	33.9
Prior occupational experience at Gisholt	16	30.2
Imitating fellow workers and asking questions	10	18.9
Instruction by supervisor	6	11.3
Classroom instruction	3	5.7
Total	53	100.0

It is seen, then, that there was little formal training on the first post-Gisholt job. The displaced workers who found employment relied primarily upon their occupational experience at Gisholt or upon the instruction from fellow workers. They acquired the skill needed for the new job by imitating fellow workers or asking questions. Relatively few received formal classroom instruction of instruction from a supervisor.

3. Post-Gisholt Earnings

The average weekly earnings of re-employed workers in the sample was $161.07 for skilled craftsmen and $129.32 for semiskilled operatives. Translated into hourly earnings, craftsmen averaged $4.13 an hour, while operatives averaged $3.83.

Because individual earnings on initial jobs with Gisholt were influenced by the prior related employment experience of workers, it is interesting to investigate the relationship between post-Gisholt earnings and experience associated with previous employment at Gisholt. Thus, average weekly earnings in the post-Gisholt period is regressed upon the following independent variables:

1. Demographic factors, including age at time of separation from the company (D_a) expressed as a set of dummy variables which correspond to five age groups--under 25, 25-30, 31,40, 41-50, and over 50; and educational attainment (D_{ed}) also expressed as a set of dummy variables corresponding to attainment levels--under 10 years, 10-11 years, 12 years, 13-14 years and 15-16 years.

TABLE VIII-5

REGRESSION ANALYSIS OF AVERAGE WEEKLY EARNINGS ON POST-GISHOLT JOBS BY OCCUPATIONAL GROUP OF HIGHEST PAYING GISHOLT JOB[a]

Variable Symbol	Definition	Coefficient of Regression and Standard Errors[b] Skilled Craftsmen	Semiskilled Operatives
D	Demographic factors		
	D_a Age at time of separation from the company[c]		
	25-30	2.36 (1.43)+	.96 (1.55)
	31-40	2.83 (1.63)+	1.66 (3.69)
	41-50	7.46 (3.76)*	3.66 (2.82)
	50 plus	6.45 (3.87)+	.68 (.57)
	D_{ed} Educational attainment[d]		
	10-11	3.70 (2.40)+	3.00 (4.43)
	12	5.32 (3.87)	10.45 (8.73)
	13-14	9.39 (4.75)	27.38 (9.34)**
	15-16	I.O.R.	24.45 (27.56)
S'	Vocational training experiences both prior to and during employment at Gisholt[e]		
	S'_{hs} High school vocational education (1, 0)	3.08 (2.07)	1.83 (1.37)
	S'_{ph} Post-high school vocational education	3 32 (3.44)	1.11 (2.55)
	S'_{o} Other vocational training	5.49 (4.26)	2.58 (5.40)
	S'_{af} Vocational training in the armed forces	1.93 (2.05)	.87 (1.42)
$T_{ft}^{(h)*}$	Method of training on highest paying job at Gisholt (1 - formal training, 0 = no formal training received)	4.47 (3.49)	1.58 (2.04)
$Sk^{(h)(j)}$	Skill level comparison of post Gisholt job j with highest paying Gisholt job h (1 = both jobs are of the same general skill level, 0 = they are of different skill levels)[f]	10.33 (4.04)**	7.76 (3.92)
$AT^{(j)}$	Method of training on post-Gisholt job (1 = formal training, 0 = no formal training)	-4.81 (2.87)+	-3.56 (2.13)+
C	Constant	32.20 (16.40)*	47.56 (24.45)*

TABLE VIII-5 (cont.)

$\bar{X}$	161.07	129.32
R^2	.33	.41
S. E. of E.	21.71	45.28
F-Ratio	2.96*	2.09+
N	.99	.57

a Includes only those workers who found employment.

b Standard errors of regression coefficients are in parentheses.

c Referenced to workers under 25 years of age.

d Referenced to workers with less than 10 years of education.

d Categories are not mutually exclusive.

e Value determined by categorizing both jobs as unskilled, semiskilled or skilled.

$\bar{X}$ Mean of dependent variable.

R^2 Coefficient of determination.

S. E. of E. Standard error of estimate.

+ Significant at the .10 level.

* Significant at the .05 level.

** Significant at the .01 level.

I.O.R. Insufficient observations for regression.

2. A set of four dummy variables (S'), representing worker participation in vocational training programs both prior to and during employment at Gisholt.

3. A dummy variable ($T_{ft}^{(h)*}$) denoting whether a worker received formal training as preparation for his highest paying job with the Gisholt Company.

4. A dummy variable ($Sk^{(h)(j)}$) coded as 1 if both the highest paying Gisholt job (job h) and the post-Gisholt job (job j) are of the same general skill level, that is, unskilled, semiskilled, or skilled, and coded as 0 if they are not.

5. Finally, a dummy variable ($AT^{(j)}$) signifying if the worker received additional formal training on his post-Gisholt job j.

Table VIII-5 reports the regression coefficients and other selected regression statistics when the above model is fitted to data for two classes of workers--those who attained craftsmen or operative level status while working at Gisholt. Although both former craftsmen and former operatives appear to benefit from training received at Gisholt, that is, the coefficient on variable $T_{ft}^{(h)*}$ is positive, these results are not statistically significant; but given the extent of occupational and industrial mobility exhibited by both samples, the absence of a significant relationship is not surprising. As described, relatively few laid-off workers obtained jobs on which prior training in their principal Gisholt occupation was logically related. This conclusion gains added credence from the performance of variable $Sk^{(h)(j)}$, the comparison of skill levels between post-Gisholt and highest paying Gisholt jobs. Former skilled craftsmen who transferred to new craftsmen-level positions in the post-Gisholt period earned $10.33 more than those who were required to make major changes in their occupational status; similarly, workers employed as semiskilled operatives at Gisholt and who were re-employed at the semiskilled level earned $7.76 more than other former operatives who also found new jobs. Both results are statistically significant.

Finally, workers who reported additional training on their post-Gisholt job earned less than those who reported no additional training. Since the follow-up

period after the shutdown was relatively short, it would appear that many workers reporting training were still engaged in that training when surveyed. We would expect a different sign on this relationship if these workers were re-surveyed at a later date.

One result not reported in Table VIII-5 is also relevant to this investigation. An interaction variable was included in the model in order to examine the effects of added training on earnings when the occupation of that job was of the same skill level as the former Gisholt job. In symbolic terms, the interaction variable is defined as $Sk^{(h)(j)} \times AT^{(j)}$. When included in the regression, this interaction term showed no significant additional predictive power; in fact, the variable had almost zero variance. One plausible explanation is that persons who required additional training were, by and large, the same persons who altered the general skill level of their occupation. On the basis of this finding, we cannot escape the feeling that had there been greater opportunity for worker re-employment in durable manufacturing establishments, more extensive amounts of skill transferability would have been achieved.

4. Conclusion

The brief period of analysis following the plant shutdown did not provide an appropriate test for the transferability of skills from Gisholt to alternative employment. The investigation was limited by the character of industrial employment in the Madison area and worker reluctance to look for work elsewhere in the short period following their layoff.

However, over 40 percent of those who were laid off found employment in the post-shutdown period, and their prior skill development had a major influence on the probability of their re-employment. The probability of re-employment was significantly greater for skilled craftsmen and semiskilled operatives than for laborers and clerical workers. Younger workers and workers with greater educational

attainment and vocational training had significantly greater probability of re-employment than older workers, than the less educated, than those without vocational training prior to their Gisholt employment.

Employers in the Madison area were able to benefit from the training and skill development that the former Gisholt employees had acquired before the plant shutdown. Less than one-third of all the newly employed workers had additional training, and even less than one-half of those who found new jobs as skilled craftsmen and semiskilled operatives received additional training. Relatively few additional hours of training occurred on any of the new jobs, and this training was relatively informal. The new employers were forced to spend little on classroom instruction or instruction by supervisors, and yet the jobs obtained by many of the skilled craftsmen and semiskilled workers were by no means at the lowest end of the earnings scale.

Although younger workers had a higher probability of re-employment, older workers had higher average weekly earnings on their post-Gisholt jobs, especially in the case of skilled craftsmen. The most important influence on post-Gisholt earnings, however, was the relatedness of the post-Gisholt job to the job held by employees prior to the Gisholt plant shutdown. Skilled craftsmen and semiskilled operatives who were able to transfer to new jobs in similar skill categories had significantly higher earnings than those who were required to make major changes in their occupational status after the plant shutdown.

CHAPTER IX

IMPLICATIONS FOR THE METHODOLOGY OF TRAINING SURVEYS

Although this report has concentrated on the causes, characteristics, and consequences of training programs, the pilot case study also had methodological objectives. The inquiry was designed to make the following contributions to methodology of surveys of industrial training: (1) to compare the accuracy of data on training obtained from employees with data obtained from the training records of the company; (2) to ascertain the differences in the employee recall on training when data are gathered through a highly structured mail questionnaire as compared to the results obtained through personal interviews; (3) to provide the Department of Labor with recommendations for potential survey methods and workable definitions of training activities to be used in forthcoming surveys and analyses of private company training programs.

These issues are discussed following a brief indication of the relationship of this inquiry to the earlier methodological survey conducted by the University of Wisconsin and the experimental approaches currently being carried out by the U.S. Bureau of Labor Statistics.

1. Relationship to Other Methodological Inquiries

Earlier national surveys to determine the extent and nature of private company training programs have been discussed in Chapter II. Although they form the primary basis of our current national information on company training, they do not meet the present urgent need for data on training in the private sector. This conclusion stems from problems of methodology as well as from the fact that the earlier national surveys were conducted approximately a decade ago. Given prior experience with such surveys, the U.S. Bureau of Labor Statistics and the Manpower Administration felt that it would be desirable to first field an experimental

survey designed to determine the feasibility of gathering data on private company training programs by means of national survey instruments. The findings of that feasibility survey and the resultant recommendations were communicated to the BLS and to the Manpower Administration and served to shape plans for further experimentation with survey approaches.[1] Based on personal interviews with relevant managerial personnel in approximately 250 companies in eight cities, the survey of the availability of data concluded that the national mail questionnaire survey of companies is not an effective procedure for the acquisition of data on company training programs. Many of the companies maintained no records on the extent, costs, or characteristics of their training programs, and company officials indicated varying degrees of difficulty in tabulating many of the basic types of data series requested by the interviewer. The gaps in data and the difficulties of making the requested tabulations were amply confirmed by the limited return of the mail questionnaires which the interviewers left with company officials. These mail questionnaire returns were very deficient not only in quantity but also in the quality of the responses. It was concluded that time considerations were significant as an obstacle to the completion of the questionnaires by busy company personnel. In many cases, motivation for completion of the time-consuming questionnaire was lacking. However, it was also found that serious problems of definition and conceptual misunderstandings impeded the successful completion of the pilot questionnaire. Many of these problems were deemed to be fundamental and would apply to any questionnaire designed to gather data on training in industry. It was felt that the problems could not be readily overcome in a mail survey.

The interviewers in the earlier feasibility study concluded that there was little that they could do to ease the burden for the company representatives in completing a questionnaire on training programs. The required data were too often

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[1] Gerald G. Somers, with the assistance of Myron Roomkin and others, The Availability of Data on Company Training Programs: A Feasibility Study (Madison: University of Wisconsin, Center for Studies in Vocational and Technical Education, 1971).

either nonexistent or in such bad shape that only extensive digging could unearth the valued nuggets of information. Only company representatives could do such digging, and, unfortunately, few of them felt that such an investment of their time would be worthwhile.

On the basis of these findings, the earlier methodological inquiry concluded that personal interviews should be conducted with a relatively small sample of establishments with more than 500 employees, scientifically selected to reflect industrial and geographic sectors. Prior to the interview, special efforts should be made to locate the appropriate respondent (using the telephone) and this individual should be "indoctrinated" in the purposes and value of the survey. A one-page mail questionnaire should be sent to a relatively large national sample of firms, scientifically selected to represent a cross-section of American industry, with the exception that establishments with fewer than 500 employees should be under-represented. The mail questionnaire should ask for general estimates and should call only for check marks wherever possible. Given the detailed information obtained in the small sample of personal interviews, data obtained in the mail survey, adjusted by industry, area, and firm size, could be used for broader conclusions concerning training in U.S. industry. It was felt that the insignificant amount of training taking place in small firms would not warrant the inclusion of a substantial number of them in a national survey. However, some smaller firms should be included for purposes of generalizations based on company size.

Since the earlier survey found that there were special difficulties in obtraining cost data, it was recommended that the questions on the cost of training should be pursued with only a select sample of respondents whose initial reaction indicated cooperation and the availability of the required data; such cooperative companies are likely to be few in number. It was also recommended that great care be taken in the wording of the questions on cost of training because of the complications of assigning costs to training as compared with the regular functions of supervisors, fellow workers, and the personnel department.

Even in the case of the personal interviews, it was felt that copies of the questionnaire--or shortened versions of it--would have to be left with the respondent to give him time to dig for further data or to refer the questionnaire to a more appropriate company official. Data on training programs, when they existed, were found to be scattered between the personnel department, a training department, department heads, and supervisors. It was also noted that a return visit by the interviewer or a telephone call would probably be necessary to obtain the completed questionnaire. The suggestion was made that experiments be conducted with a procedure entailing initial telephone calls and mail submissions, to be followed by personal contact at the time of the completion of the questionnaire. Since the personal interviews would serve as bench marks for the mail survey, it was also suggested that considerable resources, including repeated calls, should be expended in order to make the personal interview returns with a small select sample of firms as complete as possible. The survey indicated that the interviewer could make an early judgment as to the value of follow-up persistence for particular firms, and that for those firms which showed promise, persistence could pay off in fairly complete data. The relatively high cost of this approach should be tempered by a reduced sample rather than by reduced persistence.

Since the definition of "on-the-job training" caused special problems, it was suggested that questions which simply asked about the extent of on-the-job training or the costs and characteristics of on-the-job trainees would produce little information of value. More effective results could be obtained if the requests for data regarding on-the-job training referred to the following criteria: (a) the acquisition of productive skills through the advice, assistance, and/or guidance of a supervisor or other employee; (b) reduced payments to trainees or reduced productivity of trainees during a learning period; and (c) payments of additional amounts to employees who conducted training or the loss of productivity of such trainers or of supervisors while engaged in training.

Utilizing some of these suggestions and recommendations, the Bureau of Labor Statistics, with the financial support of the Manpower Administration, is now conducting experimental surveys in the following three phases:

1. Mail Survey. A total of 470 establishments--400 metal-working, 27 telephone, and 43 electric power--selected according to standard sampling procedures were included in the survey. Questionnaires were mailed or delivered to establishments in July 1971. At the close of the survey, 316 schedules had been received by the Bureau--a response rate of 67 percent. Of these 316 returns, approximately 55 percent were usable. This provided a response rate of usable returns of approximately 35 percent of the original sample.

2. Response Analysis. Personal interviews are to be conducted with 150 of the 470 establishments in the mail survey, including both respondents and non-respondents. The primary purpose of the response analysis is to identify reporting problems and response errors.

3. Diary Approach. A total of 72 establishments--50 metal-working, 10 telephone, and 12 electric power--are included in this phase of the survey. The diary method will test the feasibility of collecting data similar to that collected in the mail survey employing a form in which employers maintain a continuous (weekly) record of their occupational training activities.

Following completion of these training surveys, the BLS will prepare a report for the Manpower Administration which will set forth its recommendations concerning the feasibility of conducting a comprehensive, multi-industry survey of occupational training. The report will also contain recommendations concerning the method of data collection--that is, mail questionnaires, mail questionnaires plus personal interviews, or the diary approach.

Although a further assessment of the appropriate methodology will have to await the BLS report, this pilot survey of training and trainees in the Gisholt Company confirms many of the findings and conclusions of the earlier survey

conducted at the University of Wisconsin. Since the Gisholt study involved interviews and mail questionnaires of employees and personal interviews with company officials, it provided an opportunity to assess the relative strengths and weaknesses of employee-oriented versus employer-oriented approaches as well as mail versus personal interview approaches.

2. Surveys of Employees Versus Surveys of Company Officials

Ideally, a survey of training and skill acquisition in private industry should combine interviews with trainees and company personnel, as has been done in this pilot study. Only the individual trainees can provide information on previous work and training experience, and they seem to be the only active source of information on the extent of their on-the-job training. Although company officials, especially supervisors, can throw additional light on the process of on-the-job training, it is apparent from our interviews that many company officials do not distinguish carefully between orientation training, specific skill training, and "learning by doing." Supervisors and some of the trainees often had divergent views concerning the amount of time they spent in instructing new employees on the job. It is felt that the employees themselves provide the best guide to the nature of methods by which they acquired their skills on the job. They are able to indicate whether they received instruction from fellow workers or supervisors in blocks of time which would constitute a formal training period, and they are able to indicate whether they learned their job primarily by observing other workers with just occasional questions--a process which we would not categorize as formal on-the-job training. They are also in the best position to know whether the help given them by supervisors should be classed as on-the-job training or as simply the exercise of customary supervisory functions.

However, data obtained directly from employees are not necessarily error-free, and it would be unwise to accept claims of training without developing

appropriate checks designed to weed out blatantly outlandish responses. Worker claims of training, unsubstantiated by supportive evidence, can be recoded, as we have done in our empirical analysis. Also, the potential for error in employee responses is minimized when data are being simultaneously sought from employers, thereby providing an alternative yardstick for determining the reasonableness of worker responses.

Thus, for the thorniest issue of definition encountered in surveys of company training practices, that is, the definition of on-the-job training, responses from the trainees themselves appear to be the most reliable source of information, provided additional efforts are made to determine the instructional characteristics of the training.

For classroom instruction and other kinds of formal training which occurs under company auspices or on company premises but off-the-job, this pilot study shows that company records rather than trainee recollections provide the best data source.

The same is not true, however, of data on worker participation in training programs which took place before joining the firm. Company personnel records contained a paucity of data on pre-employment training and education. Somewhat to our surprise, no effort was made to update personnel records to reflect worker participation in training programs taken on their own time and at their own expense. Thus, surveys of employees and employers provide an indispensable combination in the acquisition of data on company training.

The intensive study of training in the Gisholt Company confirms the conclusion of our earlier survey that data on training costs in private industry are not now available in sufficient quantity or quality to permit worthwhile analysis. Many training expenses borne directly by the companies were not associated with company training activities. Compiled data often were collected for other than training-related reasons and were scattered throughout various departments of the firm.

The diary approach being utilized in the Bureau of Labor Statistics experiment would seem to be a possible solution to this problem. New devices must be found to induce employers to maintain records on training costs and to separate these costs from other personnel functions. This can only be done through some process of education and instruction, and the records can best be maintained on a weekly basis by means of some forms or guidelines provided by the data-gathering agency.

Although the study concludes that a combination of employee surveys and employers surveys are best for the acquisition of data on company training, it is recognized that this can be a rather costly procedure. However, as in our earlier report, we would emphasize the desirability of reducing costs by reducing the size of samples rather than by utilizing less costly collection methods--less costly methods that provide data of low quality.

3. Mail Questionnaires Versus Personal Interviews

The findings of our earlier survey concerning mail questionnaires and personal interviews in approaching company officials about training data are reaffirmed by the pilot Gisholt study. We conclude that a mail questionnaire sent to the Gisholt officials would have provided only a shadow of the data that were gathered in personal interviews with Gisholt management at all levels. The unavailability and inaccessibility of data at Gisholt appear to be typical of other companies of its size. Company officials are not likely to go to the considerable trouble of gathering these data and reporting on them for a mail questionnaire. The recommendations, noted above, of a combined personal interview and mail questionnaire approach for company officials is emphasized once again here. The diary approach being utilized by the Bureau of Labor Statistics is also worthy of careful consideration and, as noted above, it may be the only way of obtaining accurate cost data.

The personal interviews with Gisholt workers clearly produced a greater wealth of information on prior training practices and Gisholt training experience than would have been possible through the mail questionnaires. The personal interviews permitted us to check the accuracy of the mail questionnaires and to gauge the seriousness of nonresponse to the mail questionnaires. Thus, for workers as well there would seem to be a useful combination of personal interviews and mail questionnaires. It was found that a simplified mail questionnaire, with carefully constructed questions, especially with regard to the nature of on-the-job training, could provide reasonably complete and accurate data. However, it was necessary to have a short questionnaire and therefore to omit some important aspects of training. Here, too, a personal interview survey of a small select sample of employees, combined with mail questionnaires and telephone follow-ups of a much larger sample of employees, would appear to be the optimum approach.

4. Guidelines for Future Surveys of Training

The previous discussion of the recommendations of the feasibility study of gathering data on training in business and industry and the reaffirmation of these recommendations through the Gisholt study provides a basis for our recommendations for a national study. These results indicate that an initial comprehensive survey of training in business and industry is feasible and that prospects are encouraging for additional surveys, perhaps on a bi-yearly basis. In such surveys, a combination of personal interviews for a selected sample of companies and a selected sample of employees should be combined with mail questionnaire surveys for a larger sample of companies and a larger sample of employees. Obviously, the costs of the survey will be sizable, but experience suggests that cheaper methods of data retrieval in this area produce scanty data of poor quality.

In order to ensure the success of an employer-employee survey, we recommend the continued development of occupational definitions on an industry-by-industry basis. Admittedly, almost no difficulty with occupational titles was encountered

in the Gisholt study, but it was precisely because of the variance in occupational titles between firms that we opted for a simpler, case study approach.

Because company-sponsored training is usually conducted in response to occupational shortages, it seems prudent to focus future surveys on occupations, industries, or areas experiencing such shortages. Although a sample selected on this basis will not be totally representative of all U.S. industry, it will ensure that the final sample includes a reasonable number of firms and employees currently engaged in training activities. To the extent that we wish to use the survey for forming public manpower policies, a focus on occupational shortages seems justifiable.

The definitions of on-the-job training should be those, or similar to those, utilized in the Gisholt study. It is pointless to ask workers or company officials "How much on-the-job training did you get?" or "How much on-the-job training is there in this company?" On-the-job training can only be measured by asking a series of specific questions on such related issues as (a) initial wage rates as compared with average wage rates, (b) productivity during a learning period as compared with productivity of a full-fledged worker on the job, (c) the time spent by supervisors in training, (d) the time spent by fellow workers in training, and (e) the extent of direct instruction on training as compared with simple observation and occasional questions by employees.

Even though we recommend a national survey to acquire comprehensive data on training in business and industry, we also recognize the benefits stemming from surveys of a much smaller geographic scope. Some resources may be wisely spent assessing company-provided training in specific labor market areas, using the recommended dual surveys of employers and employees. At the local level, government can enlist the support of management and labor groups to increase participant cooperation. Furthermore, local manpower planners could use this information as a basis for designing and coordinating decentralized manpower programs.

Finally, the greatest obstacle to any further study of training is the dearth of official company records pertaining to worker training within the firm. If we value data on training in business and industry, at some point methods must be developed which will encourage employers to gather these data in a simple, though systematic and consistent manner. While we are unable at this time to recommend the format for such an ongoing data collection system, we do recommend that future efforts to gather these data also entail a large education component. Employers will not respond to exhortation; we must convince them that cooperation is in their own self-interest.

Until such programs can be implemented, we find merit in less formal employer reports on their training activities, even if the data are of the anecdotal variety. A likely clearinghouse for this information is the local CAMPS group, since it is in the best position to evaluate and act on this intelligence.

Needless to say, these recommendations are based on limited experiments and approaches. The current Bureau of Labor Statistics surveys should add an important dimension to our knowledge of the most useful and effective approaches to gathering data on company training.

CHAPTER X

SUMMARY AND CONCLUSIONS

Despite the limited nature of a case study, this study of one medium-sized firm in the machine tool building industry has added to our knowledge of employer-sponsored training and methods of worker skill acquisition. The major findings of the study are summarized below, followed by our suggestions for further research in the area of worker training.

1. Company Training Practices

According to company officials, company training practices were related to nearly all other aspects of the firm's operations. Changes in the amount, method, and content of training were usually in response to changes in local labor market conditions, product manufacturing, product sales, and company personnel policy. Some company representatives spoke of the company's commitment to developing worker potential as the chief justification for training. However, upon investigation, the determinants of company training practices were found to be primarily of an economic nature; the existence and characteristics of occupational shortages represented the principal explanatory factor.

Three aspects of occupational shortages were found to have a direct impact upon company training policies. First, there was a reduction in the quality of workers available for employment at Gisholt. Second, in an industry experiencing rapidly changing technology, the occupational mix of employment changed, requiring new skills and occupations while reducing the skill requirements of some entry-level jobs. Third, occupational shortages were typically unpredictable and the employment need usually immediate.

For these reasons, it was necessary for the company to move toward better and quicker methods of worker preparation. As noted, there was some desire among

company managers to establish greater control over the on-the-job training process, to improve the quality of instruction, and to institute more classroom instruction. Had the plant remained in operation at a high level of production, the company would most likely have been forced to take a very close look at its training effort--how it was planned, organized, and implemented.

At one time or another, the Gisholt Company had conducted a wide variety of training programs, but not all were in operation at the time of our inquiry. The following types of training were conducted for blue-collar employees: (1) formal on-the-job training, involving acknowledged reduction in worker and trainee productivity during training; (2) classroom instruction; (3) apprenticeship programs for selected skilled trades; (4) short courses or special learning sessions conducted outside the plant on a rotation basis; (5) special upgrading programs, designed to improve the skill and knowledge of selected semiskilled and skilled employees; (6) service training sessions for maintenance workers from other companies representing Gisholt's customers; and (7) anticipatory training--an uncoordinated method of worker skill acquisition in which employees learned new skills or new jobs during slack periods on their primary jobs, under the supervision of the immediate foreman. Programs for white-collar employees included management training seminars, supervisory training sessions, and a tuition-remission program.

Even though the company maintained an array of training programs and procedures, remarkably little effort was made to coordinate and evaluate them. No written company training policy existed and evaluatory efforts usually focused on the performance of individuals rather than on the effectiveness of the program per se. It was not surprising, therefore, to find company records on training activities to be scanty and not up-to-date. As described below, the availability of data was greater for classroom programs (including apprenticeship training). Data on training costs were almost nonexistent.

2. The Sources of Employee Skills

Formal institutional training was much more important than on-the-job training in developing skills of Gisholt employees prior to their employment with the company. Vocational education in high school and post-high school institutions, as well as vocational training received in the armed forces, were most important forms of prior institutional training for Gisholt workers. "Learning by doing" was also an important source of skill development for each of the skill groups.

The total prior investment in skill development was greatest for skilled craftsmen. The investment for semiskilled operatives and clerical employees was roughly similar and, in both cases, was below the level reported by skilled craftsmen. However, it is notable that in the case of the craftsmen only 9.3 percent reported that they had taken apprenticeship training prior to their first skilled jobs at Gisholt.

For the sample of Gisholt workers taken as a whole, age at the time of first employment with the company, length of service with the company, educational level, and skill level were significant determinants of the probability that the employee had had some training prior to his Gisholt employment.

A separate regression analysis of the skilled craftsmen group brought out interesting differences between the effects of education and of year of entry into Gisholt on the probability of prior training as compared with training on the first Gisholt job. Whereas increased educational attainment for skilled craftsmen increased the probability of their having had prior training, it reduced the number of hours of training on the first Gisholt job. On the other hand, a later year of entry into Gisholt was associated with a higher probability of pre-Gisholt training as well as with an increased number of hours of training on the first Gisholt job.

The increased probabilities that employees would have had pre-Gisholt training associated with later starting ages, later starting years, and higher educational attainment were especially applicable to prior institutional training as compared with prior on-the-job training.

Since there are few consistent relationships between pre-Gisholt training and the skill of employees' highest-paying jobs at Gisholt, it is reasonable to assume that the training and experience of employees after they began work at Gisholt played a more important role in their advancement to higher-paying jobs than did their pre-Gisholt training and employment experience.

It was the combination of on-the-job training and classroom instruction which dominated the experience of the skilled craftsmen and apprentices, and to a lesser extent the semiskilled operatives, on their first Gisholt jobs. However, for clerical employees and laborers, on-the-job training without separate or related classroom instruction, was the only form of training utilized at Gisholt, regardless of the workers' previous training and experience before taking Gisholt employment. For skilled craftsmen and semiskilled operatives, the combined on-the-job and classroom training resulted in a significantly larger number of total hours of training on the first Gisholt jobs than was the case of those who took on-the-job or classroom training separately. Except for the unskilled laborers, the year of entry into the Gisholt plant was significantly related to the number of hours of training on the first Gisholt job. However, in the case of skilled craftsmen and semiskilled operatives, the relationship was positive, with each year of entry after 1920 adding 4.3 and 4.8 hours of first-job training, respectively; in the case of clerical workers, the relationship was negative, with a reduction of 7 hours of first-job training for every later year of entry into the plant.

It would seem reasonable to conclude that the Gisholt Company assumed an increasingly greater responsibility for the training of craftsmen and semiskilled operatives in the later years of its existence. Clerical employees appear to have received greater amounts of training in schools and other institutions in the later years, and consequently training by the company declined.

The analyses in Chapter V confirm the view that workers can arrive at the same occupational skill status through a variety of paths, ranging from formal

vocational education to informal "learning by doing." The various paths may be used in combination or in isolation, and a company such as Gisholt can benefit from the skills acquired by its workers through a variety of public and private sources before they become company employees.

In spite of the benefits derived from prior skill acquisition, Gisholt employees continued to undergo many hours of training on their first jobs with the company. To some extent, previous training and education served to reduce the need for training by Gisholt. Years of potential employment elsewhere were significantly associated with a reduction in training hours at Gisholt. However, the company's training policy was not static. The year of entry into Gisholt was also significantly related to the amount of training on the first job.

3. The Benefits of Company Training

Training given newly hired employees is not always associated with higher levels of post-training average weekly earnings. On-the-job training, the most frequently used method of formal instruction, tends to be negatively related to post-training earnings, while a mixture of training techniques combining classroom training with on-the-job instruction is positively related to individual earnings. The analysis suggests, therefore, that on-the-job training is not as effective a method of worker preparation as the more comprehensive combination of classroom and on-the-job training sessions. The inadequacy of on-the-job training appears to become greater as we move up the occupational ladder, requiring the firm to intensify and expand its training efforts in order to compensate workers for their relative lack of prior training and related employment experience.

The effectiveness of the classroom+on-the-job approach in worker training is underscored by the impact such training had upon worker promotion within the firm. Recipients of this combined on- and off-the-job method as preparation for their first Gisholt jobs tended to reach their highest craft positions within the firm

at a faster rate than either those trained solely with on-the-job instruction or those who supposedly needed no added instruction at all.

From a worker's perspective, training received on his initial Gisholt job laid a sound foundation for mastering the duties and responsibilities associated with subsequent positions at Gisholt. Looking at the highest paying job held by persons in our sample, those who received formal training initially were also those who eventually earned substantially more per week. The magnitude of this benefit, of course, was directly related to the occupational level eventually obtained.

Additionally, training given in connection with worker promotion to a new company job resulted in sizable benefits to promoted employees.

From the company's perspective, formal training is intended to alter the productivity of certain workers. The principal benefit of training for the company, therefore, must be some measure of improved productivity. Since no data on productivity existed, employee earnings were used as a proxy for productivity. On this basis, it can be assumed that the promotions and increased earnings of employees associated with their training resulted in equivalent productivity gains for the company.

4. The Costs of Training

Data on the costs of company training are even more elusive than other types of statistical information on company training programs. It was possible to obtain some information on the employees' own expenditures on tuition, books, and materials in the institutional training programs taken prior to their Gisholt employment. Even this required personal interviews rather than mail surveys. However, the data required for the determination of the opportunity costs of training on the job, such as the comparison between learner's wages and the full rate for the job, could best be obtained from company records. Workers and supervisors might also be able to recall the time they spent in training new employees.

Company records are also needed for data on instructional costs. This involves probing and much digging by the research investigators. It calls for a level of company cooperation which would not be readily forthcoming in a large-scale mail survey.

However, there were also some encouraging signs. The Gisholt Company maintained some records that might permit a calculation of important aspects of opportunity costs. And workers and supervisors might be able to recall other data that would contribute to the determination of opportunity costs of training. But, most important, the company officials were concerned about cost data, and it is likely that such officials could be induced by surveyors to maintain the necessary records which could be used in surveys of training costs in industry. However, this would involve a combined program of education, exhortation, and specific instruction. Without this approach prior to a training survey, the survey would probably be doomed to the collection of sparse and unreliable data on the costs of company training.

5. Employment and Training Experience After the Plant Shutdown

The brief period of analysis following the plant shutdown did not provide an appropriate test for the transferability of skills from Gisholt to alternative employment. The investigation was limited by the character of industrial employment in the Madison area and worker reluctance to look for work in the short period following their layoff.

However, over 40 percent of those who were laid off found employment in the post-shutdown period, and their prior skill development had a major influence on the probability of their re-employment. The probability of re-employment was significantly greater for skilled craftsmen and semiskilled operatives than for laborers and clerical workers. Younger workers and workers with greater educational

attainment and vocational training had significantly greater probability of re-employment than older workers, the less educated, and those without vocational training prior to their Gisholt employment.

Employers in the Madison area were able to benefit from the training and skill development that the former Gisholt employees had acquired before the plant shutdown. Less than one-third of all the newly employed workers had additional training, and even less than one-half of those who found new jobs as skilled craftsmen and semiskilled operatives received additional training. Relatively few additional hours of training occurred on their new jobs, and such training as they received was relatively informal. Their new employers were forced to spend little on classroom instruction or on instruction by supervisors, and yet the jobs obtained by many of the skilled craftsmen and semiskilled workers were by no means at the lowest end of the earnings scale.

Although younger workers had a higher probability of re-employment, older workers had higher average weekly earnings on their post-Gisholt jobs, especially in the case of skilled craftsmen. The most important influence on post-Gisholt earnings, however, was the relatedness of the post-Gisholt job to the job held by employees prior to the Gisholt plant shutdown. Skilled craftsmen and semiskilled operatives who were able to transfer to new jobs in similar skill categories had significantly higher earnings than those who were required to make major changes in their occupational status after the plant shutdown.

6. The Methodology of Training Surveys

Our earlier study of the feasibility of gathering data on training in business and industry, reaffirmed by this case study, provides a basis for our recommendations for future surveys. If costs permit, a combination of personal interviews for a selected sample of companies and a selected sample of employees should be

combined with mail questionnaire surveys for a larger national sample of companies and a larger national sample of employees.

Even though we recommend a national survey to acquire comprehensive data on training in business and industry, we also recognize the benefits stemming from surveys of a much smaller geographic scope. Some resources may be wisely spent assessing company-provided training in specific labor market areas, using the recommended dual surveys of employers and employees. At the local level, government can enlist the support of management and labor groups to increase participant cooperation. Furthermore, local manpower planners could use this information as a basis for designing and coordinating decentralized manpower programs.

In order to ensure the success of an employer-employee survey, we recommend the continued development of occupational definitions on an industry-by-industry basis. Admittedly, almost no difficulty with occupational titles was encountered in the Gisholt study, but it was precisely because of the variance in occupational titles between firms that we opted for a simpler case study approach.

The definitions of on-the-job training should be those, or similar to those, utilized in the Gisholt study. It is pointless to ask workers or company officials "How much on-the-job training did you get?" or "How much on-the-job training is there in this company?" This question can be approached only by asking specific questions on initial wage rates as compared with average wage rates, productivity during a learning period as compared with productivity of a full-fledged worker on the job, the time spent by supervisors in training, the time spent by fellow workers in training, and the extent of direct instruction or training as compared with simple observation and occasional questions by employees.

Finally, the greatest obstacle to any further study of training is the dearth of official company records pertaining to worker training within the firm. If we value data on training in business and industry, at some point methods must be developed which will encourage employers to gather these data in a simple, though

systematic and consistent manner. While we are unable at this time to recommend the format for such an ongoing data collection system, we do recommend that future efforts to gather these data also entail a large education component. Employers will not respond to exhortation; we must convince them that cooperation is in their own self-interest.

Needless to say, these recommendations are based on limited experiments and approaches. The current Bureau of Labor Statistics surveys should add an important dimension to our knowledge of the most useful and effective approaches to gathering data on company training.

APPENDIX A

Mail Questionnaire for Hourly Employees

A1

THE UNIVERSITY OF WISCONSIN
MADISON, WISCONSIN 53706

CENTER FOR STUDIES IN VOCATIONAL
AND TECHNICAL EDUCATION
SOCIAL SCIENCE BUILDING
1180 OBSERVATORY DRIVE

February 1, 1971

Dear Sir or Madam:

The Center for Studies in Vocational and Technical Education, University of Wisconsin, in cooperation with the Gisholt Machine Company, is conducting a study of worker training and education. The purpose of this study is to determine how workers acquire their skills and to document the skill composition of the Madison labor force. With this information, better and more efficient training programs can be constructed; the results of this study could represent valuable information to perspective employers desiring to locate in Madison.

Please understand that this is not a recall letter from the Gisholt Machine Company, but rather the Gisholt Machine Company is requesting that its present and recent employees cooperate with this research project.

Enclosed you will find a short questionnaire that has been mailed to all persons who were employed by Gisholt during 1970. This questionnaire seeks information on your schooling, training, and employment experience. Please complete it and return it to us in the enclosed pre-addressed, postage-paid envelope, as soon as possible.

Let us stress that all of your answers will be held in strict confidence. This is a statistical study, and the answers of individual respondents will not be identified or reported; only members of the research staff at the University of Wisconsin will ever see the returned questionnaires. Even though the company is cooperating with us, no company official will see the individual questionnaires or be able to identify respondents.

It is important for each person to complete and return this questionnaire. To be of any value, we must learn about all the workers who were employed at Gisholt during 1970. Those of you who no longer work for Gisholt can still provide valuable information to aid in the improvement of worker training and education in Wisconsin, as well as to assist in gathering data which will be useful to potential employers.

Thank you very much for your cooperation.

Sincerely yours,

Gerald G. Somers
Director

Myron Roomkin
Research Associate

GGS:MR:slo
Enclosure

CENTER FOR STUDIES IN VOCATIONAL AND TECHNICAL EDUCATION
THE UNIVERSITY OF WISCONSIN

A2

Code No.

Skill Acquisition in Industry: A Pilot Case Study--Mail Questionnaire

Please answer all of the following questions that apply to you. Since some questions do not apply to you, please follow the skip instructions that will tell you which question to answer next.

All of your answers to these questions will remain confidential and no one will be able to identify your answers to any of these questions. The code number is included simply to let us know about any failure to respond.

When you have finished answering all the questions that apply to you, please return this questionnaire in the pre-addressed, postage-paid envelope.

Thank you very much for your cooperation.

1. Age: _____ 2. Sex: M F (Circle one) 3. Marital Status: _____

4. Race: _____ 5. Where were you born? _____
City State Country

6. What is the highest grade in school you completed?

(Circle one)

1 2 3 4 5 6 7 8	9 10 11 12	13 14 15 16	17+
Elementary School	High School	College	

IF YOU DID NOT ATTEND COLLEGE, PLEASE SKIP TO QUESTION 11.

7. What college did you attend? _____

8. What was your major course of study in college? _____

9. Did you graduate from college? _____yes PLEASE SKIP TO QUESTION 11.

_____no

10. If you did not graduate, how many credit-hours did you complete? _____credit-hours.

QUESTIONS ARE CONTINUED ON NEXT PAGE.

11. In Col. A (below), we have listed six different methods which workers use to obtain skills and occupational knowledge, not connected with their place of employment. Please indicate which of these methods you have used by placing a check (√) in the appropriate boxes of Col. A. For each method of training you have checked please answer all of the questions listed in Cols. B to F.

COL. A ve you participated in the llowing types of training ograms: (Check one or more the following). ↓	COL. B What occupation, trade or skill did you learn in this training program?	COL. C When did you attend this program?	COL. D Approximately how much instruction did you receive?	COL. E Do you think this training helped you get your first job with Gisholt?	COL. F Approximately how much money did it cost you to take this training? Include cost of books tuition. & carfare
Vocational, technical industrial arts education ile still in high school ☐		From: _____19__ To: _____19__	_____ months or _____ weeks	_____ yes _____ no	$_____
Post-high school voca- onal or technical train- g in a vocational school jr. college (not includ- g apprenticeship trng.) ☐		From: _____19__ To: _____19__	_____ months or _____ weeks	_____ yes _____ no	$_____
An apprenticeship ogram ☐		From: _____19__ To: _____19__	_____ months or _____ weeks	_____ yes _____ no	$_____
A government retrain- g program on-military) ☐		From: _____19__ To: _____19__	_____ months or _____ weeks	_____ yes _____ no	$_____
Correspondence hool courses ☐		From: _____19__ To: _____19__	_____ months or _____ weeks	_____ yes _____ no	$_____
Training courses ven while in the med Forces other an sic training ☐		From: _____19__ To: _____19__	_____ months or _____ weeks	_____ yes _____ no	$_____ (Cont.)

12. Was your job with the Gisholt Machine Company your first full-time job?

____yes PLEASE SKIP TO QUESTION 14.

____no PLEASE ANSWER QUESTION 13 BELOW.

13. We would like to know about the last three jobs you had before becoming a Gisholt employee.

For each of these three jobs please give the following information:	THE JOB YOU HAD JUST BEFORE WORKING FOR GISHOLT	THE JOB JUST BEFORE THAT	THE JOB JUST BEFORE THAT
a. Name of the employer and location.			
b. Dates of your employment	From ____19__ To____19__	From____19__ To____19__	From____19__ To____19__
c. What this company made or did			
d. Your job or occupational duties with the company			
e. The approximate number of hours you worked per week	____hrs/wk	____hrs/wk	____hrs/wk
f. Your average weekly earnings before taxes	$_____	$_____	$_____
g. Did this employer train you to do this job? If no, go to j.	____yes ____no	____yes ____no	____yes ____no
h. Approximately how much training and instruction did you need to learn this job?	____ hrs. or ____ weeks	____ hrs. or ____ weeks	____ hrs. or ____ weeks
i. After the training and instruction ended, approximately how much additional practice and experience did you need to feel reasonably competent doing this job?	____ hrs. or ____ weeks	____ hrs. or ____ weeks	____ hrs. or ____ weeks
j. If you received no training from the employer, how did you learn how to do this work?			
k. Do you think your experience at this job helped you get your first job with the Gisholt Machine Company?	____ yes ____no	____ yes ____ no	____ yes ____ no

(CONTINUED)

14. We need information on some of the jobs you had while working for the Gisholt Machine Company. Specifically we are interested in your first job with the Gisholt Company, your Gisholt job that paid you your highest hourly base rate, and your current or last job with the Gisholt Company. In the space provided below, please answer all of the questions listed in Col. A for each of these three (3) jobs.

COL. A We would like to know the following information about each of these three (3) jobs:	YOUR FIRST JOB WITH GISHOLT	YOUR HIGHEST HOURLY RATE GISHOLT JOB	YOUR CURRENT OR MOST RECENT GISHOLT JOB
a. What were your occupational duties on this job? (Please be specific; if you operated a machine, for example, please tell what type of machine.)			
b. When did you work at this job?	From ____ 19__ To ____ 19__	From ____ 19__ To ____ 19__	From ____ 19__ To ____ 19__
c. What was your average weekly salary before taxes?	$_____	$_____	$ _____
d. On the average, how many hours did you work per week?	_____ hrs.	____ hrs.	____ hrs.
e. Before becoming a Gisholt employee did you ever have another job that was similar to this?	___ yes ___ no	___ yes ___ no	___ yes ___ no
f. Approximately how much training and instruction at Gisholt did you need to learn this job? (If no training was received enter 0, but please be sure to answer QUESTION 15)	_____ hrs. or _____ weeks	____ hrs. or ____ weeks	____ hrs. or ____ weeks
g. After the training and instruction ended, or in the absence of training, approximately how much additional practice and experience did you need to feel reasonably competent doing this job?	_____ hrs. or _____ weeks	____ hrs. or ____ weeks	____ hrs. or ____ weeks

(CONTINUED)

15. We have listed in COL. A the major ways in which employees acquire skills needed to perform their jobs. For each job just discussed in Question 14 (your first Gisholt job, the Gisholt job with the highest hourly wage rate, and your current or most recent Gisholt job), please number in order of importance the first, second and third most important method used to acquire the skill to perform each of these jobs.

COL. A--Ways of Acquiring Skill to Perform a Job	1st GISHOLT JOB	HIGHEST RATE JOB	CURRENT OR MOST RECENT
(check all that apply) a. as part of an apprenticeship program			
b. instruction by supervisor who takes time out of his own work			
c. instruction in a classroom by a special instructor or teacher			
d. instruction by a fellow worker who takes time out of his own work			
e. watching fellow workers and imitating them			
f. asking occasional questions of fellow workers as help is needed			
g. drawing on the experience a worker has had with previous employers			
h. drawing on experience with the same company on another job			
i. some other method (Please tell us what it was.)			

16. Employers have many different training aids and devices that they can use to help workers learn their job. We have listed some of these aids and devices in COL. A below. Please number in order of importance the three principal aids and devices that were used by Gisholt to help you learn each of the three jobs we have been discussing.

COL. A	1st GISHOLT JOB	HIGHEST RATE JOB	CURRENT OR MOST RECENT
Which of the following training aids and devices were used to teach you each of these jobs? (Please check all that apply.)			
a. training manuals			
b. charts and graphs			
c. movies or slide projections			
d. demonstrations by competent workers			
e. time to practice			
f. discussions with your supervisor			
g. other aids and devices (Please tell us what they were.)			

(CONTINUED)

17. Are you currently employed by the Gisholt Machine Company? (check one)
_____yes PLEASE SKIP TO QUESTION 26.
_____no PLEASE ANSWER QUESTIONS 18 to 25.

18. When did you leave? ___19__ PLEASE GIVE MONTH AND YEAR

19. Why did you leave your job with Gisholt Machine Company? (check one)
_____ I quit
_____ I was laid off
_____ other (what? _____)

20. Which of the following methods have you used to look for work since leaving your job with the Gisholt Company? (check all that apply)
_____ I went to the State Employment Service
_____ I went to a private employment agency
_____ I read the newspaper want ads
_____ I went directly to companies and asked for a job
_____ I asked my relatives or friends about jobs
_____ Other (What? _____)

21. Have you worked since leaving your Gisholt job? (check one)
_____ yes PLEASE ANSWER QUESTIONS 22.
_____ no PLEASE SKIP TO QUESTION 23.

22. We would like to know about the jobs you had after leaving Gisholt. Please provide the desired information on the first three jobs you had after leaving Gisholt.

We would like to know the following information	THE FIRST JOB AFTER LEAVING GISHOLT	THE SECOND JOB AFTER GISHOLT	THE THIRD JOB AFTER LEAVING GISHOLT
a. Name of the employer and location			
b. The dates of your employment	_____19__ to____19__	____19__ to__19__	_____19__ _____19__
c. What this company made or did			
d. Your job or occupational duties			
e. Your average weekly earnings before taxes	$_____	$_____	$_____
f. Is this job similar to any job you had while working for Gisholt?	____yes ____no	____yes ____no	____yes ____no
g. Did you have to train to perform this job? If no, go to i.	____yes ____no	____yes ____no	____yes ____no
h. Approximately how much training and instruction did you need to learn this job?	____hrs. or ____wks.	____hrs. or ____wks.	____hrs. or ____wks.
If you received no training from the employer, how did you learn how to do this work?			

(CONTINUED)

23. Are you willing to go back to work for another Giddings and Lewis Plant for a job paying as much as you were earning at Gisholt?
____yes
____no

24. Are you willing to move to obtain employment?
____yes If yes, go to Question 25.
____no If no, go to Question 26.

25. How far are you willing to move?
____ less than 50 miles
____ 50-100 miles
____ 100-200 miles
____ more than 200 miles

26. Is there any type of trade or skill you would like to learn?
____yes
____no PLEASE SKIP TO QUESTION **30.**

27. Which trade or skill is this? _____

_____

_____

28. Are you willing to pay for all or most of the cost of this training? (check one)
____I'm willing to pay for all of it
____I'll pay for most of it
____I'll pay for some of it
____I'm not willing to pay for any of the cost

29. Do you think an employer should pay for any part of this training even though you may some day leave his company and use these skills for another employer?
____yes
____no

30. What kind of job would you like to have five years from today? _____

_____

_____

Thank you very much for completing this questionnaire. Now please place it in the enclosed stamped envelope, seal the envelope, and drop it in the nearest mailbox.

APPENDIX B

Personal Interview Schedule for Hourly Employees

Office Number
Project 459
Winter, 1971

The University of Wisconsin
Survey Research Laboratory and the
Center for Studies in Vocational
and Technical Education

SKILL ACQUISITION IN INDUSTRY

1. We are interested in your education, training, and employment history. Let's start by discussing your formal education. What was the highest grade of regular school you completed? (PROBE TO GET THE MOST ACCURATE ANSWER)

_____ (# OF YEARS) (IF 12 OR LESS GO TO Q 2)

/More than 12 years/ ↓

1a. What college did you attend? _____

1b. What was your major course of study while in college? _____

_____

1c. How many credit hours did you complete? _____(CREDIT HOURS)

2. In what year did you leave school (college)? _____

3. While you attended high school (or college) did you study any of these subjects I'll read? (READ EACH SUBJECT BELOW AND CHECK IN COL. I IF IT WAS STUDIED)

COL. I STUDIED?	COL. II HI SCH.?	COL. III COLLEGE?	
_____	_____	_____	a. Arithmetic
_____	_____	_____	b. Algebra
_____	_____	_____	c. Plane geometry
_____	_____	_____	d. Solid geometry
_____	_____	_____	e. Trigonometry
_____	_____	_____	f. Calculus
_____	_____	_____	g. Drafting or mechanical drawing
_____	_____	_____	h. Chemistry
_____	_____	_____	i. Physics
_____	_____	_____	j. Metallurgy
_____	_____	_____	k. Electronics

3a. (ASK FOR EACH SUBJECT CHECKED IN COL. I. ABOVE) Did you study (SUBJECT) in high school, college, or both? (CHECK IN COL. II OR COL. III, ABOVE)

242

Interviewer's Name: _____ Int. No.: _____

Date: _____ Time Started: _____

4. There are many different methods which workers use to obtain skills and occupational knowledge not connected with a place of employment. Here is a list of these different methods. (SHOW CARD 1)
(READ EACH ITEM AND ASK THE FOLLOWING QUESTIONS FOR EACH METHOD; RECORD ANSWERS ON NEXT PAGE)

4a. Have you ever participated in this method of skill acquisition? (IF NO, GO TO NEXT METHOD)

4b. What occupation, trade, skill, or subject did you learn in this program? (PROBE FOR AS MUCH DETAIL AS POSSIBLE)

4c. When did you attend this program?

4d. Did you attend this program full time or part time?

4e. Approximately how much training and instruction (hours, days, or weeks) did you receive?

4f. About how much did this training cost you for

A. tuition?

B. books?

C. other expenses (e.g., car fare)?

4g. Do you think this training ever helped you get a job? (IF NO, GO TO NEXT METHOD)

4h. What were your occupational duties on this job? (PROBE FOR AS MUCH DETAIL AS POSSIBLE)

4i. What did this employer manufacture or do?

4j. Do you think that this training helped you get your first full time job with Gisholt?

WORKER TRAINING HISTORY, PART I

CARD 1

Vocational, technical or industrial arts ed. while in H.S.	Post H.S. vocat. technical in voc. or jr. college	Apprenticeship program
/Yes/ ↓ /No/ →	/Yes/ ↓ /No/ →	/Yes/ ↓ /No/ (TO NEXT PAGE)
_____ 19___ to _____ 19___	_____ 19___ to _____ 19___	_____ 19___ to _____ 19___
/Full/ /Part/	/Full/ /Part/	/Full/ /Part/
_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks
$_____	$_____	$_____
$_____	$_____	$_____
$_____	$_____	$_____
/Yes/ ↓ /No/ (TO NEXT METHOD)	/Yes/ ↓ /No/ (TO NEXT METHOD)	/Yes/ ↓ /No/ (TONEXT METHOD)
/Yes/ /No/	/Yes/ /No/	/Yes/ /No/

(METHODS OF TRAINING ARE CONTINUED ON NEXT PAGE)

(READ EACH ITEM AND ASK THE FOLLOWING QUESTIONS FOR EACH METHOD; RECORD ANSWERS ON NEXT PAGE)

4a. Have you ever participated in this method of skill acquisition? (IF NO, GO TO NEXT METHOD)

4b. What occupation, trade, skill, or subject did you learn in this program? (PROBE FOR AS MUCH DETAIL AS POSSIBLE)

4c. When did you attend this program?

4d. Did you attend this program full time or part time?

4e. Approximately how much training and instruction (hours, days, or weeks) did you receive?

4f. About how much did this training cost you for...

A. tuition?

B. books?

C. other expenses (e.g., car fare)?

4g. Do you think this training ever helped you get a job? (IF NO, GO TO NEXT METHOD)

4h. What were your occupational duties on this job? (PROBE FOR AS MUCH DETAIL AS POSSIBLE)

4i. What did this employer manufacture or do?

4j. Do you think that this training helped you get your first full time job with Gisholt?

WORKER TRAINING HISTORY, PART II

CARD 1 (continued)

Government retraining non-military	Correspondence school	Training courses while in the Armed Forces	Other (SPECIFY):
/Yes/ /No/ →	/Yes/ /No/ →	/Yes/ /No/ →	/Yes/ /No/ (TO Q 5)
____ 19__ to ____ 19__	____ 19__ to ____ 19__	____ 19__ to ____ 19__	____ 19__ to ____ 19__
/Full/ /Part/	/Full/ /Part/	/Full/ /Part/	/Full/ /Part/
____ Hours ____ Days ____ Weeks	____ Hours ____ Days ____ Weeks	____ Hours ____ Days ____ Weeks	____ Hours ____ Days ____ Weeks
$____	$____	$____	$____
$____	$____	$____	$____
$____	$____	$____	$____
/Yes/ /No/ (TO NEXT METHOD)	/Yes/ /No/ (TO NEXT METHOD)	/Yes/ /No/ (TO NEXT METHOD)	/Yes/ /No/ (TO Q 5)
/Yes/ /No/	/Yes/ /No/	/Yes/ /No/	/Yes/ /No/

5. Was your job with Gisholt your first full time job? /Yes/ (TO Q 7) /No/ ↓

6. Let's talk about the last three jobs you had before coming to work for Gisholt. (ASK FOLLOWING QUESTIONS FOR EACH OF THE THREE JOBS; RECORD ANSWERS IN APPROPRIATE SPACE ON THE NEXT PAGE)

6a. Starting with the job you had just before coming to work for Gisholt, what was the name of this employer? (What was the name of your employer before this?)

6b. Where was this firm located?

6c. When did you work for this firm?

6d. What did this firm manufacture or do?

6e. What were your occupational responsibilities and duties with this firm? (PROBE FOR SPECIFIC DETAILS OF EACH JOB)

6f. Approximately, how many hours a week did you work for this firm?

6g. What were your average weekly earnings before taxes?

6h. Here is a list of the ways employers train workers to do jobs. (SHOW CARD 2) Please tell me which of these methods were used by this employer to teach you this job. (WRITE IN THE LETTER OF ALL METHODS MENTIONED)

6i. Which of the methods you have just mentioned was the major method by which you learned how to do this work?

6j. (IF R SELECTED CHOICE "c") About how much instruction (hours, days, weeks) did you receive in the classroom?

6k. (IF R SELECTED CHOICES "a," "b," or "d") About how much instruction (hours, days, weeks) did you receive from your supervisor or fellow workers on the job?

6l. (After the training and instruction ended), (In the absence of training), approximately how much additional practice and experience (hours, days, weeks) did you need to feel reasonably competent doing this job?

6m. Was this job identical, very similar, kind of similar or totally unlike your first job with the Gisholt Machine Company?

6n. Do you think your experience at this job helped you get your first job with the Gisholt Machine Company?

PRE-GISHOLT EMPLOYMENT HISTORY

The job you had just before Gisholt	The job just before that	The job just before that
From: _____ 19__ To: _____ 19__	From: _____ 19__ To: _____ 19__	From: _____ 19__ To: _____ 19__
_____Hrs./Wk.	_____Hrs./Wk.	_____Hrs./Wk.
$_____per week	$_____per week	$_____per week
____ ____ ____ ____ ____ ____	____ ____ ____ ____ ____ ____	____ ____ ____ ____ ____ ____
_____(LETTER, CARD 2)	_____(LETTER, CARD 2)	_____(LETTER, CARD 2)
_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks
_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks
_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks
/Ident./ /V.Sim./ /Sim./ /Unlike/ /D K/	/Ident./ /V.Sim./ /Sim./ /Unlike/ /D K/	/Ident./ /V.Sim./ /Sim./ /Unlike/ /D K/
/Yes/ /No/	/Yes/ /No/	/Yes/ /No/

7. Now, I would like to discuss your employment with the Gisholt Machine Company. First, let's briefly outline all the different types of jobs you had while working for Gisholt. Please look at this list of jobs and tell me which you have had during your employment with Gisholt. (SHOW CARD 3) (CHECK ALL THAT R MENTIONS. NOTE THAT ITEM "c" REQUIRES FURTHER DETAIL THAN SPECIFIED ON THE CARD)

_____ a. Machine assembly and sub-assembly

_____ b. Electrical panel assembly and sub-assembly

_____ c. Metal working machines including tool and die making

(IF "c" CHECKED, ASK: Which of the following machines have you operated? And was this machine a tape-assisted unit?)

		TAPE ASSISTED UNIT?	
_____ 1.	lathes.	/Yes/	/No/
_____ 2.	boring	/Yes/	/No/
_____ 3.	grinder	/Yes/	/No/
_____ 4.	milling	/Yes/	/No/
_____ 5.	planers	/Yes/	/No/
_____ 6.	threaders	/Yes/	/No/
_____ 7.	balancine	/Yes/	/No/
_____ 8.	other (What?)		
	_____	/Yes/	/No/
	_____	/Yes/	/No/
	_____	/Yes/	/No/

_____ d. Casting

_____ e. Foundry work

_____ f. Pattern making

_____ g. Heat treating and plating

_____ h. Maintenance and machine repair

_____ i. Clerks and stock work

_____ j. Other (What?)

_____

_____

_____

8. I would like to get some additional details on a few of the jobs you have just mentioned. Please focus on your first job with Gisholt.

8a. What were your specific occupational responsibilities and duties on this job? (PROBE FOR A SPECIFIC DESCRIPTION OF THE JOB)

8b. What were your average weekly earnings before taxes?

8c. On the average, how many hours a week did you work?

3d. Looking at the list of ways employers teach workers to do jobs, please tell me which of these methods Gisholt used to teach you this job? (SHOW CARD 2; WRITE LETTER FOR EACH METHOD SELECTED)

8e. Which of the methods you have indicated was the most important one used?

8f. Which of the methods was the second most important?

8g. Which was the third most important?

8h. (IF R SELECTED CHOICE "c" ON SHOW CARD 2) About how much instruction (hours, days, weeks) did you receive in the classroom?

8i. (IF R SELECTED CHOICES "a," "b," or "d" ON SHOW CARD 2) About how much instruction (hours, days, weeks) did you receive on the job?

8j. (After the training ended), (In the absence of training), how much additional practice or experience (in hours, days, weeks) did you need to feel reasonably competent doing this job?

8k. How satisfied were you with the way you were prepared for this job? Were you very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, or very dissatisfied? (IF AT ALL DISSATISFIED ASK Q 81)

81. Why?

8m. Was this job identical, very similar, kind of similar, or totally unlike any other job you had before working for Gisholt? (IF AT ALL SIMILAR ASK Q 8n.)

8n. Which job was this? What were your occupational responsibilities and duties? (PROBE FOR SPECIFIC DETAILS OF EACH JOB)

8o. What did this employer make or do?

8p. When did you have this job?

9. Now let me ask you the same questions about the Gisholt job that paid you your highest hourly base rate. (REPEAT Q"s a THRU p AND RECORD IN APPROPRIATE COLUMN ON OPPOSITE PAGE)

10. Finally, let's discuss your current or most recent job with Gisholt. (REPEAT Q's a THRU p AND RECORD IN APPROPRIATE COLUMN ON OPPOSITE PAGE)

Q 8. First Gisholt Job	Q 9. Highest Rated Gisholt Job	Q 10. Last or Current Gisholt Job
$_____per week	$_____per week	$_____per week
_____Hrs. per week	_____Hrs. per week	_____Hrs. per week
___ ___ ___ ___ ___ ___	___ ___ ___ ___ ___ ___	___ ___ ___ ___ ___ ___
_____(LETTER, CARD 2)	_____(LETTER, CARD 2)	_____(LETTER, CARD 2)
_____(LETTER)	_____(LETTER)	_____(LETTER)
_____(LETTER)	_____(LETTER)	_____(LETTER)
_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks
_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks
_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks	_____ Hours _____ Days _____ Weeks
/V.S./ /Sat./ /Neither/ (GO TO Q 8m) (TO Q 8m) /Dissat./ /Very Dis./ ↓ ↓	/V.S./ /Sat./ /Neither/ (GO TO Q 8m) (TO Q 8m) /Dissat./ /Very Dis./ ↓ ↓	/V.S./ /Sat./ /Neither/ (GO TO Q 8m) (TO Q 8m) /Dissat./ /Very Dis./ ↓ ↓
/I/ /VS/ /S/ /Un/ /DK/ (TO Q 8o) ↓ ↓ ↓	/I/ /VS/ /S/ /Un/ /DK/ (TO Q 8o) ↓ ↓ ↓	/I/ /VS/ /S/ /UN/ /DK/ (TO Q 8o) ↓ ↓ ↓
From: _____ 19___ To: _____ 19___	From: _____ 19___ To: _____ 19___	From: _____ 19___ To: _____ 19___

11. Employers have many different training aids and devices that can be used to help workers learn their jobs. In terms of your first job with Gisholt, which of the devices I'll read were used to help you learn that job?

	Q 11. First Job		Q 12. Highest Rate		Q 13. Last or Current	
11a. Charts and graphs. . .	/Yes/	/No/	/Yes/	/No/	/Yes/	/No/
11b. Training manuals . . .	/Yes/	/No/	/Yes/	/No/	/Yes/	/No/
11c. Movies, or slide projections.	/Yes/	/No/	/Yes/	/No/	/Yes/	/No/
11d. Demonstrations by competent workers. . .	/Yes/	/No/	/Yes/	/No/	/Yes/	/No/
11e. Discussions with your supervisor . . .	/Yes/	/No/	/Yes/	/No/	/Yes/	/No/
11f. Time to practice . . .	/Yes/	/No/	/Yes/	/No/	/Yes/	/No/

11g. Other (SPECIFY): _____
(12g) _____
(13g) _____

12. Now let's go through the list of training devices again for your Gisholt job with the highest hourly rate. (RECORD ABOVE)

13. Finally, think about your current or most recent job with Gisholt. (RECORD ABOVE)

14. Now for each job we have been discussing, please tell me which of the training aids and devices you have just mentioned were the first, second, and third most important type of device used to teach this job.

14a. First Gisholt job: 1st____; 2nd ____; 3rd ____
(WRITE LETTERS)

14b. Highest hourly rate job: 1st ____; 2nd ____; 3rd ____
(WRITE LETTERS)

14c. Last or current job: 1st ____; 2nd ____; 3rd ____
(WRITE LETTERS)

15. In general, how satisfied were you with the opportunity for training at Gisholt? Were you very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, or very dissatisfied?

/Very satisfied/ /Satisfied/ /Neither/ /Dissatisfied/ /Very dissatisfied/

16. Why? _____

_____

_____

_____

17. How satisfied were you with the opportunity for promotion when you worked for Gisholt?

/Very satisfied/ /Satisfied/ /Neither/ /Dissatisfied/ /Very dissatisfied/

18. Why? _____

_____

_____

_____

19. I would like to switch the focus of our discussion and talk a little about what would happen at Gisholt when a new worker or a worker who had never performed a particular job before came into the shop. While you were working for Gisholt did you ever serve as a trainer or instructor to such a worker?

/Yes/ ↓ /No/ (GO TO Q 20)

19a. Let's discuss the most recent time this happened. What was your job or occupational duty at that time? _____

_____

19b. What job were you supposed to teach to the new or inexperienced worker? _____

_____

19c. How did you teach him this job? Of the methods I'll read, tell me which one method was the main one you used. (CHECK ONE ONLY)

____ You let him watch while you worked and you answered his questions.

____ He worked by himself and you answered his questions.

____ You gave him formal instructions like a lecture.

____ Some other way. (SPECIFY): _____

_____

_____

19d. Did your supervisor or foreman give you any instructions on how to train this new man?

/Yes/ /No/

19e. Did you ever meet with your supervisor or foreman to discuss the progress and problems of this new worker? /Yes/ /No/

19f. During the first week you were teaching or training this new worker, approximately how much (what percentage) of your time on the job did you have to spend instructing and answering his questions?

_____%

20. Do you know of any employers in Madison or the surrounding community that usually employ workers at jobs that are similar to your most recent or current Gisholt job?

/Yes/ /No/ (TO Q 21)

20a. Will you tell me the names of two such companies?

(1) _____

(2) _____

21. As you well know, Gisholt has unfortunately decided to go out of business, but as yet, are you still employed there?

/Yes/ (TO Q 23) /No/

21a. Why did you leave your job with Gisholt?

/Quit/ /Laid-off/ Other: _____ (SPECIFY)

21b. When did you leave? _____19___

21c. Since leaving, which of the following methods have you used to look for work? (SHOW CARD 4; CHECK ALL METHODS USED)

/None/ /Haven't looked/

CARD 4

____ a. Went to the State Employment Service

____ b. Went to private employment agencies

____ c. Read newspaper want ads

____ d. Went directly to companies and asked for work.

____ e. Asked friends and relatives for work and information about jobs

____ f. Other (SPECIFY): _____

21d. Have you worked since leaving your Gisholt job? /Yes/ (TO Q 22) /No/ (TO Q 23)

22. I would like to discuss your employment since leaving Gisholt. Let's start with the first job you had after leaving Gisholt and work up to your current or most recent job? (ASK FOLLOWING QUESTIONS FOR EACH JOB; RECORD ANSWERS IN APPROPRIATE SPACE ON NEXT PAGE; IF MORE SPACE NEEDED, USE SUPPLEMENTAL PAGE)

22a. Who did you work for first (next)?

22b. Where was this firm located?

22c. When did you work for this firm?

22d. What did this firm manufacture or do?

22e. What were your occupational responsibilities and duties with this firm? (PROBE FOR SPECIFIC DETAILS OF EACH JOB)

22f. Approximately, how many hours a week did you work for this firm?

22g. What was your average weekly salary before taxes?

22h. Here is a list of the way employers train workers to do jobs. (SHOW CARD 2) Please tell me which of these methods were used by this employer to teach you this job. (WRITE IN THE LETTER OF ALL METHODS MENTIONED)

22i. Which of the methods you have just mentioned was the major method by which you learned how to do this work?

22j. (IF R SELECTED CHOICE "c") About how much instruction (hours, days, weeks) did you receive in the classroom?

22k. (IF R SELECTED CHOICES "a," "b," or "d") About how much instruction (hours, days, weeks) did you receive from your supervisor, foreman or fellow workers on the job?

221. (After the training and instruction ended) or (In the absence of training) approximately how much additional practice and experience (hours, days, weeks) did you need to feel reasonably competent doing this job?

22m. Was this job identical, very similar, kind of similar, or totally unlike your highest rated Gisholt job we previously discussed?

22n. Do you think your experience at Gisholt helped you get this job?

POST-GISHOLT EMPLOYMENT HISTORY

First Job After Gisholt	Next Job After That	Next Job After That
From: _____ 19__ To: _____ 19__	From: _____ 19__ To: _____ 19__	From: _____ 19__ To: _____ 19__
_____ Hrs. per week	_____ Hrs. per week	_____ Hrs. per week
$_____ per week	$_____ per week	$_____ per week
___ ___ ___ ___ ___ ___	___ ___ ___ ___ ___ ___	___ ___ ___ ___ ___ ___
_____(LETTER, CARD 2)	_____(LETTER, CARD 2)	_____(LETTER, CARD 2)
_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks
_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks
_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks	_____Hours _____Days _____Weeks
/I/ /V.S./ /Sim./ /Un/ /DK/	/I/ /V.S./ /Sim./ /Un/ /DK/	/I/ /V.S./ /Sim./ /Un/ /DK/
/Yes/ /No/	/Yes/ /No/	/Yes/ /No/

23. Are you willing to go to work for another Giddings and Lewis plant for a job paying as much as you are earning now (as much as your last job)?

/Yes/ ↓ /No/ ↓ /Don't know/ (TO Q 25)

24. Why? _____

_____

25. Are you willing to move to find employment? /Yes/ ↓ /No/ (TO Q 26)

25a. How far are you willing to move...50 miles or less, 50-100 miles, 100-200 miles, or more than 200 miles?

/Less than 50 miles/ /50-100 miles/ /101-200 miles/ /More than 200 miles/

26. Is there any type of trade or skill you would like to learn?

/Yes/ ↓ /No/ (TO Q 27)

26a. Which trade or skill is this? _____

_____

26b. Are you willing to pay for all, most, some, or none of the costs of this training?

/All/ /Most/ /Some/ /None/

26c. Do you think an employer should pay for any part of this training even though you may some day leave his company and use these skills for another employer?

/Yes/ /No/

27. What kind of a job would you like to have five years from today?

_____

_____

Finally, I would like to ask a few background questions which will help us interpret the results of this survey.

28. How old are you? _____ YRS.

29. Are you married, widowed, separated, divorced, or have you never married?

/Married/ /Widowed/ /Separated/ /Divorced/ /Never married/

30. In what city and state were you born?

_____ (CITY), _____ (STATE OR COUNTRY)

31. What is your current address? _____

That's all the questions I have. Thank you very much for your cooperation.

Project 459

INTERVIEWER'S SUPPLEMENT

A1. Time interview ended: _____

A2. Make sure the data on contacts you have made at this housing unit, including the present contact, have been supplied in full on the cover sheet.

A3. R's race is: /White/ /Negro/ Other: _____

A4. R's sex is: /Male/ /Female/

A5. R's cooperation was: /Very good/ /Good/ /Fair/ /Poor/

A6. This housing unit is in a structure that contains:

/One HU only/ /2-9 HU's/ /10 or more apartments/ /Rooming house/

Other: _____

THUMBNAIL SKETCH

APPENDIX C

Personal Interview Schedule for Foremen or Supervisors

Center for Studies in Vocational and Technical Education
"Skill Acquisition in Industry: Pilot Case Study"

FOREMAN OR SUPERVISOR SUPPLEMENTAL INTERVIEW

Subject's Name: _____

Address: _____

Date: _____

1. I understand that during 1970 you served as a foreman or supervisor at Gisholt. Because of this experience, your knowledge of worker training and preparation can be very important to us. First, what was your job (occupational duties and responsibilities) before you became a foreman or supervisor with Gisholt? _____

_____

_____

2. When did you receive your first supervisory job with Gisholt?

_____19_____

3. Before joining Gisholt did you every have a supervisory position with another employer?

/ Yes / ↓ / No / ↓

4. During 1970, what was your job as supervisor or foreman with Gisholt?

_____

_____

5. How many men or women did you supervise during this job?

_____number

6. We are very interested in your responsibilities and duties when new hires or inexperienced workers had to be taught new jobs. When you were _____ which of the following methods did you use to teach these workers their job?

(READ EACH METHOD AND WRITE YES OR NO FOR EACH)

_____ a. apprenticeship
_____ b. classroom lecturers, demonstrations, and discussions
_____ c. instruction from you while they worked at the job
_____ d. instruction from one of the other, more experienced men in the ship (n.b., MAKE SURE R ANSWERS Q. 8 - Q. 14)
_____ e. the new workers just imitated the other workers and asked questions when needed
_____ f. they already knew how to do these or similar jobs
_____ g. some other method of worker preparation (what?)

_____

_____

_____

7. Of these methods you have just mentioned (READ THE SELECTED ITEMS BACK TO R) which was the first, second, and third major method you used to train and prepare new workers?

First _____ (letter); Second _____ (letter); and Third _____ (letter)

(Did R select method d in Q. 6?)

/ No / (GO TO Q. 15) / Yes / ↓

8. You have indicated that sometimes new workers received instruction from a more experienced worker in your shop. When selecting an experienced worker to serve as a trainer or instructor which of these qualities (SHOW CARD 5) did you look for in the experienced worker?

(READ AND RECORD YES AND NO FOR EACH)

_____ a. the worker with the best available knowledge of his own job
_____ b. the worker with the best available knowledge of the job to be taught
_____ c. the worker with the best performance on his own job
_____ d. the worker who had the best ability to get along with others
_____ e. the best teacher in the shop
_____ f. the worker with the most seniority
_____ g. some other quality (what?) _____

_____

9. Which of these qualities you have mentioned was the most important from your point of view?

_____ letter

10. Did you find yourself choosing the same worker to be the trainer and instructor each time such a need arose?

/ Yes / ↓ / No / ↓

11. After selecting a trainer did you discuss with him the training and preparation of the new worker?

/ No / (GO TO Q. 12) / Yes / ↓

11a. What type of things were you likely to discuss?

_____

_____

_____

_____

_____

_____

12. Which of the following statements best describes the timing of the on-the-job instruction as it was usually provided by the experienced worker?

(SHOW CARD 6, READ EACH STATEMENT AND RECORD LETTER)

_____ a. The trainer instructs the new worker only when he has slack time after completing his own work.

_____ b. The trainer instructs the new worker in the details of the job during the initial few days of employment. He returns to doing his work; but still takes time out to answer specific questions.

_____ c. The inexperienced worker is a helper to the instructor and he gradually gets to perform the job under less and less direct supervision.

_____ d. Some other method. (What?) _____

_____

_____

13. During the instructional period, did you make any allowance for the lost production of the experienced worker?

/ Yes / ↓

a. On the average how much of an allowance (e.g., 50%, 75% of working time) did you make during the first week?

_____%

/ No / ↓

b. Why not? _____

_____

_____

_____

_____

14. Did you hold conference with the trainer to discuss the progress and problems of the new or inexperienced worker?

/ Yes / ↓ / No / ↓

15. How frequently did you inspect the work of the new or inexperienced worker during the training period?

_____PER_____

16. Did you hold conferences or discussions with the trainee to discuss his problems and progress?

/ Yes / ↓ / No / ↓

17. Did you keep any records on worker training and abilities?

/ Yes / ↓ / No / → TERMINATE

17a. Were any of these records solely for your own use and not required by the company?

/ Yes / ↓ / No / → TERMINATE

17b. What type of information did you keep for your own use? (GET SPECIFICS)

_____

_____

_____

_____

APPENDIX D

DETERMINANTS OF THE PROBABILITY OF TRAINING ON THE FIRST GISHOLT JOB: COMPARISON OF THE RESULTS OF PROBIT ANALYSIS AND LEAST SQUARES REGRESSION

Variable	Probit MLE	OLS PRC
Age at time of entry[a]		
25-34	.323	.101
35-44	.473*	.164*
45-54	.464*	.163*
55 plus	.557*	.182*
Educational attainment[b]		
9-11	.282	.088
12	.465*	.153**
13-14	.268	.090
15-16	-.006	.001
City size[c]	-.022	-.021
Year started	.030**	.011**
Wisconsin born	-.017	-.012
Occupation of first Gisholt job[d]		
skilled craftsmen	.557**	.189**
operative	.237	.083
clerical	.281	.105
Constant	-2.27	-.292
N	639	639
R^2	-	.274

[a]Referenced to workers under 25 years of age.

[b]Referenced to workers with less than 9 years of schooling.

[c]See footnote "e" Table V-7.

[d]Referenced to unskilled workers.

OLS Ordinary least squares regression.

MLS Maximum likelihood estimators.

PRC Partial regression coefficient.

* Significant at the .05 level.

** Significant at the .01 level.

APPENDIX D-1

COMPARISON OF PROBIT AND OLS RESULTS: DETERMINANTS OF TRAINING OR NO TRAINING ON FIRST GISHOLT JOB

Variable	Probit MLE	OLS PRC
Age at time of entry[a]		
25-34	.323	.101
35-44	.473*	.164*
45-54	.464*	.163*
55 plus	.557*	.182*
Educational attainment[b]		
9-11	.282	.088
12	.465*	.153**
13-14	.268	.090
15-16	-.006	.001
City size[c]	-.022	-.021
Year started	.030**	.011**
Wisconsin born	-.017	-.012
Occupation of first Gisholt job[d]		
skilled craftsmen	.557**	.189**
operative	.237	.083
clerical	.281	.105
Constant	-2.27	-.292
N	639	639
R^2	-	.274

OLS Ordinary least squares regression.

MLE Maximum likelihood estimators.

PRC Partial regression coefficient.

* Significant at the .05 level.

** Significant at the .01 level.

APPENDIX TABLE E-1

PRE-GISHOLT TRAINING AND RELATED EXPERIENCE OF SKILLED CRAFTSMEN ON HIGHEST-PAYING GISHOLT JOB*

Pre-Gisholt Training and Related Employment Experience	N[a]	Number and Percentage of Persons Reporting Skilled Jobs as Their Highest-Paying Position (Excluding Persons Who Never Changed Jobs) in the Following Occupations:												
		Mach. Mech.	Serv. Rep.	Elec-trcn.	Insp.	Mach-inist	Auto Mech.	Mold Mkr.	Plum-berg	Tool & Die	Fore-man	Sheet Metal	Patrn. Mkrs.	Heat Trtng.
1. H.S. Voc. Ed.	56 (25.3)[b]	-- (--)	8 (13.8)[c]	-- (--)	13 (30.9)	12 (48.0)	1 (33.3)	5 (21.7)	-- (--)	17 (70.8)	-- (--)	1 (20.0)	1 (33.3)	-- (--)
2. Post HS Voc.Ed.	29 (13.1)	2 (40.0)	1 (1.7)	3 (60.0)	-- (--)	7 (28.0)	2 (66.6)	-- (--)	-- (--)	8 (33.3)	6 (60.0)	-- (--)	-- (--)	-- (--)
3. Apprenticeship	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
4. Govt. retraining	8 (3.6)	1 (20.0)	1 (1.7)	1 (20.0)	-- (--)	3 (12.0)	-- (--)	-- (--)	-- (--)	2 (8.3)	-- (--)	-- (--)	-- (--)	-- (--)
5. Correspondence	9 (4.0)	-- (--)	2 (3.4)	1 (20.0)	2 (4.8)	2 (8.0)	1 (33.3)	-- (--)	-- (--)	1 (4.2)	-- (--)	-- (--)	-- (--)	-- (--)
6. Armed forces	46 (20.8)	1 (20.0)	10 (17.2)	3 (60.0)	10 (23.8)	5 (20.0)	1 (33.3)	6 (26.0)	1 (50.0)	1 (4.2)	2 (20.0)	1 (20.0)	1 (33.3)	4 (25.0)
7. Prior exp.	73 (33.3)	2 (40.0)	-- (--)	1 (20.0)	25 (59.5)	7 (28.0)	1 (33.3)	7 (26.1)	-- (--)	18 (75.0)	7 (70.0)	2 (40.0)	-- (--)	3 (18.8)
8. Emplr.provided trng. (in #7)	6 (2.5)	2 (40.0)	-- (--)	1 (20.0)	-- (--)	2 (8.0)	-- (--)	1 (4.34)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
Total No. Obtaining This Occupation		5	28	5	42	25	3	23	2	24	10	5	3	16

[a] "N" equals the total number of all workers reporting skilled jobs as their highest-paying position (excluding those who never changed jobs) and reporting prior participation in the specific training or related experience. The training paths are not mutually exclusive, and some had none.

[b] Numbers in parentheses are the equivalent values of each cell expressed as a percentage of all workers reaching skilled jobs with the company.

[c] Numbers in parentheses are percentage of all workers reaching specific occupation, i.e., percentage of item 9.

* Those reporting skilled craftsmen occupations on their highest-paid position at Gisholt excluding those who entered as craftsmen and never changed jobs.

APPENDIX TABLE E-2

PRE-GISHOLT TRAINING AND RELATED EXPERIENCE OF SEMISKILLED OPERATIVES ON HIGHEST-PAYING GISHOLT JOB*

Pre-Gisholt Training and Related Employment Experience	N[a]	Number and Percentage of Persons Reporting Semiskilled Jobs as Their Highest-Paying Position (Excluding Persons Who Entered as Semiskilled Workers and Did Not Change Jobs) in the Following Occupations:				
		Truck and Lift Operators	Machine Assemblers	Foundry & Metal Treating	Machine Operators	Electrical Subassembly
1. High School Voc. Ed.	47 (38.2)[b]	1 (14.3)[c]	13 (56.5)	3 (23.1)	22 (37.9)	8 (36.4)
2. Post H.S. Voc. Ed.	17 (61.0)	-- (--)	-- (--)	-- (--)	12 (20.7)	5 (22.7)
3. Apprenticeship	3 (2.4)	-- (--)	-- (--)	-- (--)	3 (5.2)	-- (--)
4. Govt. retraining	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)
5. Correspondence courses	6 (4.9)	2 (28.6)	-- (--)	-- (--)	1 (1.7)	3 (13.6)
6. Armed forces	32 (26.0)	1 (14.3)	6 (26.1)	2 (15.4)	19 (32.8)	4 (18.2)
7. Prior experience	22 (17.9)	-- (--)	4 (17.3)	-- (--)	10 (17.2)	8 (36.4)
8. Employer provided training (in #7)	2 (1.6)	-- (--)	-- (--)	-- (--)	2 (3.4)	-- (--)
9. Total No. Obtaining This Occupation		7	23	13	58	22

[a] "N" equals the total number of all workers reporting semiskilled jobs as their highest-paying position (excluding those who never changed jobs) and reporting prior participation in the specific training or related experience. The latter are not mutually exclusive and some reported none.

[b] Numbers in parentheses are the equivalent values of each cell expressed as a percentage of all workers reaching skilled jobs with the company.

[c] Numbers in parentheses are percentage of all workers reaching specific occupation, i.e., percentage of item 9.

* Those reporting semiskilled operatives occupations on their highest-paid position at Gisholt excluding those who entered as operatives and never changed jobs.

APPENDIX F

DESCRIPTION OF MACHINIST APPRENTICESHIP PROGRAM AT GISHOLT

MACHINIST

ESTENT OF PERIOD OF APPRENTICESHIP:

The term of apprenticeship shall be 8,320 hours. The first 480 hours shall constitute the probationary period. Hours of labor shall be the same as established for other skilled men in the shop.

SCHOOL ATTENDANCE:

The apprentice shall attend school four hours per week, or the equivalent thereof, for a minimum of 400 hours. This school attendance shall be counted as hours of labor.

SCHEDULE OF PROCESSES TO BE WORKED:

The apprentice shall be given such instruction and experience in the machinist trade as will enable him to qualify as a competent journeyman machinist at the completion of this contract. This instruction and experience shall include the following, but not necessarily in this sequence.

MACHINIST COURSE	APPROXIMATE NUMBER OF HOURS
Storeroom	160
Tool Crib	160
Foundry	160
Inspection	240
Tool Grinding	160
Turret Lathes	800
Radial Drill	240
Milling Machine	320
Heat Treat	160
Surface Grinder	200
External Grinder	240
Internal Grinder	240
Engine Lathe	240
Thread Cutting	160
Planer and Shaper	400
Gear Manufacturing	520
Horizontal Boring Bar	680
Hone	80
Scraping	160
Tool Making	360
Assembly	760
Specialization*	1880

*Specialization may include such areas as Journeyman Machinist, Industrial Engineering, Tool Making, Machine Service and Demonstration, Machine Testing, or Supervision--as determined by the supervisor of the appropriate area.

The company reserves the right to use approximately 1040 hours of this schedule for miscellaneous related work.

The number of hours shown for each training period is an expected average. The actual time spent in each phase shall be determined by the Company's judgment of the progress of the trainee, and the needs of the Company.

RATE SCHEDULE FOR FOUR YEAR APPRENTICESHIP

1st	2nd	3rd	4th	5th	6th	7th	8th
1040 Hrs.	1040 Hrs.	1040 Hrs.	1040 Hrs.	1040 Hrs.	1040 Hrs.	1040 Hrs.	1040 Hrs.
2.97	3.035	3.10	3.165	3.23	3.295	3.425	3.555

Whenever there is an increase in the journeyman's starting rate, the apprentice rate will increase the same amount per hour.

SPECIAL PROVISIONS:

At the completion of this contract, the apprentice shall receive the sum of $100.00, which sum represents a bonus for faithful completion of this contract.

The apprentice shall, when related night classes are available, attend night school on his own time, and take such subjects, and for such period of time, as the employer deems advisable.